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WATER BULLETIN NO. 24

Flow of the Rio Grande and Related Data

From Elephant Butte Dam, New Mexico

to the Gulf of Mexico

1954

STORAGE IN MAJOR RESERVOIRS
SOURCES OF RIVER FLOW
DIVERSIONS
SUSPENDED SILT
CHEMICAL ANALYSES
SANITARY ASPECTS OF WATER QUALITY
METEOROLOGIC DATA
DRAINAGE BASIN AND IRRIGATED AREAS

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FOREWORD

This bulletin presents the twenty-fourth compilation of the stream discharges and related data concerning the international portion of the Rio Grande, prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission. The stream flow data and kindred subjects pertain to the Rio Grande and its important tributaries near their confluence with the main stream, from Elephant Butte, New Mexico to the Gulf of Mexico. The first publication in the series was Water Bulletin No. 1 for the year 1931. The present volume contains the information for the year 1954.

International stream gaging on the Rio Grande was initiated in 1889, when the station at El Paso, Texas was established. A number of stations on the Rio Grande and its tributaries downstream from El Paso were established in 1900 and operated until 1914. Between 1914 and 1923, except for a few months in 1919 and 1920, all stream gaging work on the international reach of the river was suspended. In 1923, the work was resumed and carried on independently by the two countries until 1931, when the present joint program of stream measurements was started.

During 1954, the United States Section of the Commission operated the stream gaging stations on the Rio Grande at El Paso, American Dam, Island, County Line, Fort Quitman, Upper Presidio, Lower Presidio, Johnson Ranch, Agua Verde, Langtry, Below Diablo Dam Site, Del Rio, San Antonio Crossing, Chapeño, Rio Grande City, San Benito, and Lower Brownsville. The Mexican Section operated the stream gaging stations on the main stream at Juárez, Jiménez, Eagle Pass, Laredo, Roma, Anzaldúas Dam Site, Progreso, and Matamoros. Each Section operated the gaging stations on tributary streams, floodways, and diversions within its own country.

The total drainage area within the outer rim of the Rio Grande Basin is 335,500 square miles. However, nearly half of this area yields no runoff to the river, the estimated productive area of the watershed being 182,215 square miles. Reservoirs in the basin have a total storage capacity of approximately 8,600,000 acre-feet, in addition to the International Falcón Reservoir, which has a conservation capacity of 2,400,000 acre-feet. A present total of 1,800,000 acres is irrigated below Elephant Butte Dam on the Rio Grande and below Red Bluff Dam on the Pecos River. The residual flow from the Rio Grande that escaped to the Gulf of Mexico averaged 2,400,000 acre-feet per year for the period 1934-1954.

Acknowledgments

Other agencies which have each contributed to some part of the data published herein include: the Bureau of Plant Industry, the Division of Soils and Agricultural Engineering, and the Soil Conservation Service of the U. S. Department of Agriculture; the Bureau of Reclamation and the Geological Survey of the U. S. Department of the Interior; the Weather Bureau of the U. S. Department of Commerce; the Texas Board of Health; the Colorado State Engineer; the New Mexico State Engineer; the Red Bluff Water Power Control District; the Willacy County Water Control and Improvement District No. 1; the El Paso Department of Water and Sewerage; the Laredo City Water Department; the Ministry of Hydraulic Resources of Mexico; the Meteorological Service of Mexico; the Cía. Agrícola de Fuerza Eléctrica del Río Conchos, S.A.; the Federal Board of Public Improvement Works of Nuevo Laredo, Tamaulipas; and the Water and Drainage Board of Matamoros, Tamaulipas.

Additional contributions have been made by individuals and corporations and specific notation is made for such, as well as for those of the above-named agencies, where the data appear. The courtesy and cooperation of those who made these contributions are acknowledged with our appreciation.

GENERAL HYDROLOGIC CONDITIONS FOR 1954

Along and Adjacent to the International Portion of the Rio Grande

During the year 1954, temperatures averaged 102% of normal on the watershed of the Rio Grande below Elephant Butte Dam. Evaporation averaged 98% of normal on the Rio Grande watershed from El Paso to Diablo Dam site, 95% of normal from Diablo Dam site to Falcón Dam, and 93% of normal from Falcón Dam to the Gulf of Mexico. Precipitation averaged 88% of normal from El Paso to Diablo Dam site, 72% of normal from Diablo Dam site to Falcón Dam, normal from Falcón Dam to Rio Grande City, and 106% of normal in the Lower Rio Grande Valley. Precipitation for the month of June on the Pecos River below Sheffield, Texas and Devils River watersheds averaged 569% and 456%, respectively, of the June normals.

The yearly volume of flow of the Rio Grande from El Paso to Langtry was much below normal, varying from 0.2% of normal at County Line station to 40% of normal at Johnson Ranch station and to 65% of normal at Langtry station. From Del Rio station to Laredo station, the yearly volume of flow averaged 156% of normal due to one of the greatest floods of record which originated on the Pecos River and Devils River watersheds. The annual volumes of flow passing the gaging stations at El Paso, Below American Dam, and Juárez were the lowest on record. All flows passing Rio Grande gaging stations below Falcón Dam were controlled by releases from Falcón Reservoir except for drain water, tributary inflows, and diversions below the dam.

The total annual flow of the measured tributaries below Fort Quitman was 142% of normal. The total flow of these tributaries in the United States was 3,122,600 acre-feet, or 313% of the normal flow of 998,800 acre-feet. A new maximum yearly flow was recorded at the Pecos River gaging station which was 546% of the yearly normal. The 948,000 second-foot peak flow of the Pecos River on June 28 was over 8 times the previously recorded peak on September 1, 1932, and the peak gage height of 96.24 feet was over 2-1/2 times that of 1932. The June volume of flow at the Pecos River gaging station was 30% greater than the previous yearly maximum, 260% greater than the previous monthly maximum, and 790% greater than the previous maximum for June. The annual flow passing the Devils River gaging station was 219% of normal. The annual flow of the other United States tributaries varied from 70% of normal at Terlingua Creek station to about normal at San Felipe Creek station. In Mexico, the total measured tributary flow excluding the Río Alamo and Río San Juan, was 550,400 acre-feet, or 37% of the normal flow of 1,506,300 acre-feet. A new maximum annual flow was recorded at the Arroyo las Vacas gaging station, which was 279% of the annual normal.

Return flow to the Rio Grande at the Maverick Power Plant near Eagle Pass, Texas was 483,480 acre-feet, or 87% of the six-year average. The Maverick Canal system was damaged by the June flood and, as a result, this plant did not operate from June 30 to July 20.

The greatest flood since 1865 and the second greatest since 1746 occurred at Eagle Pass and Laredo during the months of June and July. This flood was the result of torrential rains which fell on the Pecos River and Devils River watersheds. Great damage, both to life and property, was caused by this flood, particularly on the Mexican side of the Rio Grande. A great number of persons were drowned in the town of Piedras Negras. For peak discharges and volumes of these flood flows, see the records herein for the various stations.

For all reservoirs in the Rio Grande Basin of capacity greater than 15,000 acre-feet, excepting Bluewater Reservoir and International Falcón Reservoir, the average amount of water in storage in 1954 was 1,856,000 acre-feet, or 49% of the normal 3,762,000 acre-feet. In the United States, stored water in these reservoirs averaged 19% of normal, while in Mexico, the average was 67% of normal. At International Falcón Reservoir, the average amount of storage in 1954 was 1,432,000 acre-feet, with the maximum amount of 2,423,300 acre-feet of storage occurring on November 14.

Diversions from the Rio Grande in the United States were, on the average, 114% of normal. Diversions into the American Canal were 20% of normal and the lowest of record, into the Maverick Canal, 93% of normal, and below Rio Grande City, 176% of normal. In Mexico, the diversions were, on the average, 163% of normal. Diversions into Acequia Madre were the lowest on record, or 18% of normal, and into Anzaldúas and Retamal Canals, the diversions were 185% of the 1945-1954 normal of the combined diversions. Diversions for municipal uses in the United States and Mexico were 111% and 163%, respectively, of the average for the most recent ten years.

There was a great shortage of irrigation water in the El Paso-Juárez Valley, the average storage in Elephant Butte Reservoir being only 9% of normal. In the Presidio Valley, there was a shortage of irrigation water during the months of April, May, and June. There was no shortage of irrigation water below Del Rio, although conditions were becoming critical in early April before substantial rains on the watershed relieved the situation.

The total reported acreage irrigated from the Rio Grande and its tributaries below El Paso, Texas showed an increase from the 1953 total. Overall, there was an increase of 26% on the United States side and 41% on the Mexican side. On the United States side, there was a decrease of 12% from El Paso to Falcón Dam and an increase of 39% from Falcón Dam to the Gulf of Mexico. On the United States side above Falcón Dam, the reach from Johnson Ranch to Del Rio station was the only reach reporting a substantial increase. All reaches below Chapeño station reported substantial increases varying from 18% for the reach Chapeño to Rio Grande City, to 102% for the reach Matamoros to Lower Brownsville stations. On the Mexican side, with the exception of the reaches San Antonio Crossing-to-Laredo and Chapeño-to-Rio Grande City, which showed decreases of 12% and 3%, respectively, all reaches below Del Rio showed increases ranging from 2% for the reach Eagle Pass-to-San Antonio Crossing to 638% for the Rio Grande City-to-the Gulf reach. This large increase in the Lower Valley resulted largely from lands developed under the Anzaldúas Canal.

In 1954, investigations of quality of Rio Grande water extended from El Paso to Mercedes, Texas. The annual tonnage of salts, or total dissolved solids, carried by the river was much below normal from El Paso to Langtry. Tonnages from Langtry to Falcón Reservoir were only slightly below normal. Below the Reservoir, tonnages were about half of normal because of the large volume of water in storage at the end of the year.

The total average quantity of suspended silt for the year at the sampling stations on the Rio Grande above Falcón Dam was about 195% of normal.

RIO GRANDE BELOW ELEPHANT BUTTE DAM, NEW MEXICO

DESCRIPTION: Water-stage recorder 3,800 feet below Elephant Butte Dam, and cable with sit-down cable car and winch 100 feet below the recorder. Elephant Butte Dam is 135.1 river miles above the American Dam at El Paso, Texas. The zero of the gage is 4,242.09 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 49 current meter measurements during the year, a continuous record of gage heights, and a stable rating curve. Records marked "Subject to Revision" were furnished by the United States Geological Survey. Records available: January 1915 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. Beginning December 1940, hydroelectric power generation facilities for 27,000 kva were placed in operation at Elephant Butte Dam.

EXTREME FLOWS FROM RECORDS:

Average Flow in Second-Feet

Daily:	Max. 8,220	May 22, 1942	Min. 0		Occasionally	
Monthly:	Max. 7,600	May 1942	Min. 2.7		Sept. 1954	
Yearly:	Max. 2,510	1942	Min. 338		1954	

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.3	5.2	6.1	1,150	902	538	817	474	3.0	* 9.0	* 4.0	2.8
2	4.3	5.6	5.2	1,200	898	636	560	467	1.0	* 5.0	* 7.0	2.8
3	4.3	6.1	6.6	1,270	892	482	523	402	1.0	4.0	* 3.0	2.8
4	4.3	7.7	7.1	1,250	649	504	532	368	1.0	* 14.0	* 2.0	2.8
5	4.7	7.7	7.7	1,310	480	474	518	362	1.0	* 5.0	* 2.0	2.8
6	4.7	7.1	7.7	1,330	461	485	662	224	3.0	* 4.0	* 2.0	2.8
7	4.7	7.1	7.7	1,320	541	418	1,070	67.0	5.0	* 3.0	* 2.0	2.8
8	5.2	7.1	921	1,220	431	586	1,150	60.0	3.0	* 3.0	* 4.0	3.1
9	5.2	6.6	914	1,160	481	537	1,200	59.0	1.0	* 3.0	* 5.0	2.8
10	5.2	5.2	928	1,160	535	506	1,270	59.0	1.0	* 4.0	* 6.0	2.8
11	4.7	4.7	960	1,150	477	772	1,260	* 60.0	2.0	* 4.0	* 3.0	2.8
12	4.7	4.3	950	1,160	474	840	1,250	* 60.0	* 1.0	4.0	* 3.0	3.1
13	4.7	4.3	646	1,160	466	820	1,140	* 60.0	* 1.0	4.0	* 3.0	3.1
14	5.2	4.3	448	1,160	392	832	1,390	* 60.0	* 1.0	4.0	* 3.0	3.1
15	5.2	4.7	766	1,160	454	822	1,490	* 62.0	* 1.0	4.0	* 5.0	2.8
16	5.2	4.7	942	1,170	448	689	1,550	* 64.0	21.0	4.0	* 3.0	2.8
17	5.6	4.7	940	1,170	560	513	1,510	* 66.0	4.0	4.0	* 3.0	2.8
18	164	6.1	912	1,160	398	518	1,510	183	1.0	4.0	3.0	2.8
19	5.6	4.7	946	1,170	459	604	1,430	353	2.0	4.0	3.0	2.8
20	4.3	4.7	972	1,170	456	364	1,050	368	2.0	4.0	3.0	2.8
21	4.7	4.3	982	1,170	454	508	614	371	2.0	* 13.0	3.0	3.1
22	5.2	4.7	1,060	1,170	468	547	550	371	2.0	* 4.0	3.0	2.8
23	5.2	4.3	961	1,040	465	539	492	157	2.0	3.0	3.0	2.8
24	5.2	3.9	964	942	464	525	422	* 6.0	2.0	3.0	3.0	2.8
25	5.2	3.9	956	930	469	516	394	5.0	2.0	2.0	3.0	3.1
26	5.2	4.3	1,140	944	496	520	452	4.0	2.0	2.0	3.0	3.1
27	5.6	3.9	1,140	928	526	526	494	2.0	8.0	* 2.0	3.0	3.5
28	5.2	3.9	1,150	927	513	534	492	4.0	2.0	* 2.0	3.0	3.1
29	5.2		986	906	488	644	506	3.0	2.0	* 3.0	3.0	3.1
30	5.2		1,150	908	500	804	428	3.0	2.0	* 3.0	3.0	2.8
31	5.2		1,150		510		488	3.0		* 3.0		2.8
Sum	145.8			33,865		17,603		4,807.0		* 134.0		90.2
	313.2		22,932.1		16,207		27,214		82.0		* 99.0	

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		∅ Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			18	164	† 1	4.3	10.1	621	27,041	86,500	184
Feb.			† 4	7.7	†24	3.9	5.2	289	38,938	83,600	289
Mar.			†30	1,150	2	5.2	740	45,500	63,020	95,300	1,520
Apr.			6	1,330	29	906	1,130	67,200	96,564	162,000	42,300
May			1	902	14	392	523	32,100	100,684	467,000	24,400
June			12	840	20	364	587	34,900	109,348	363,000	34,900
July			16	1,550	25	394	878	54,000	108,932	211,000	54,000
Aug.			1	474	27	2.0	155	9,530	99,068	161,000	9,530
Sept.			16	21.0	† 2	1.0	2.7	163	60,260	129,000	163
Oct.			4	* 14.0	†25	2.0	* 4.3	* 266	26,801	72,100	241
Nov.			2	* 7.0	† 4	* 2.0	* 3.3	* 196	25,677	158,000	196
Dec.			27	3.5	† 1	2.8	2.9	179	25,638	87,300	179
Yearly				1,550		1.0	338	244,944	781,971	1,818,800	244,944

* Partly estimated † And other days ∅ Mean daily

RIO GRANDE BELOW CABALLO DAM, NEW MEXICO

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located .8 river mile below Caballo Dam, and 106.8 river miles above the American Dam at El Paso, Texas. The zero of the gage is 4,140.90 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 133 meter measurements during the year and a continuous record of gage heights. Records were furnished by the El Paso office of the United States Bureau of Reclamation. Records available: February 26, 1938 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. In addition to the outflow from Caballo Dam listed below, 1,324 acre-feet of water were diverted in 1954 into Bonita Lateral, a small irrigation canal just below Caballo Dam. Prior to 1938, discharge records were kept at Percha Dam, a low diversion dam about 1.5 miles downstream from this station. Small accretions to the river take place between this station and Percha Dam.

EXTREME FLOWS FROM RECORDS:

Average Flow in Second-Feet

Daily:	Max.	7,650	May 20, 1942	Min.	.1	Oct. 31 through Nov. 14, 1954
Monthly:	Max.	6,710	May 1942	Min.	.2	Nov. 1954
Yearly:	Max.	2,480	1942	Min.	337	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.6	.6	.4	1,480	613	361	473	708	961	.4	.1	.3
2	.6	.6	.4	1,500	608	383	271	704	1,260	.4	.1	.4
3	.6	.6	.4	1,600	581	409	361	695	969	.4	.1	.4
4	.5	.5	.3	1,730	431	417	476	623	505	.4	.1	.4
5	.5	.5	.3	1,690	372	542	496	497	160	.4	.1	.4
6	.5	.4	.3	1,580	352	612	699	475	5.2	.4	.1	.5
7	.5	.4	.3	1,420	374	593	949	461	4.5	.3	.1	.5
8	.5	.4	.3	1,300	455	557	1,110	282	3.9	.3	.1	.5
9	.5	.4	.3	1,210	498	482	1,110	200	3.4	.3	.1	.4
10	.5	.4	.3	1,160	634	452	1,110	169	3.0	.3	.1	.4
11	.5	.4	.3	1,120	717	524	1,110	177	2.7	.3	.1	.4
12	.5	.4	.3	1,100	660	699	1,110	130	2.4	.2	.1	.4
13	.5	.4	.3	990	545	799	1,110	90.0	2.1	.2	.1	.4
14	.6	.4	.4	814	532	881	1,090	265	1.8	.2	.1	.4
15	.6	.4	.4	692	591	924	1,070	321	1.5	.2	.2	.4
16	.6	.4	.4	677	603	969	985	453	1.2	.2	.2	.4
17	.5	.5	.4	692	550	987	928	516	1.0	.2	.2	.4
18	.5	.5	.4	727	458	918	922	603	.9	.2	.2	.4
19	.5	.6	.4	715	404	958	923	669	.9	.2	.2	.3
20	.5	.6	288	710	407	1,010	851	489	.8	.2	.2	.3
21	.5	.5	694	742	406	1,010	700	62.0	.8	.2	.2	.3
22	.5	.5	1,040	741	405	968	638	4.6	.8	.2	.2	.3
23	.5	.5	1,090	742	399	958	661	4.1	.8	.2	.2	.3
24	.5	.5	1,310	632	455	971	741	3.6	.8	.2	.2	.3
25	.5	.4	1,450	580	432	1,010	759	3.1	.7	.2	.2	.3
26	.5	.4	1,440	596	ø 399	1,100	750	2.6	.7	.2	.2	.3
27	.5	.4	1,650	562	422	1,090	695	2.1	.6	.2	.2	.3
28	.5	.4	1,840	648	493	1,090	596	289	.6	.2	.2	.3
29	.5		1,820	676	519	1,080	550	408	.5	.2	.2	.3
30	.5		1,810	637	486	875	553	499	.5	.2	.3	.4
31	.5		1,640		413		614	544		.1		.4
Sum	16.1	13.0	16,078.6	29,463	15,214	23,629	24,411	10,349.1	3,897.1	7.8	4.7	11.5

Current Year 1954 — Period 1938-1954

Month	Extreme Gage Feet		ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	High Day	High	Low Day	Low			Average	Maximum	Minimum
Jan.			† 1	.6	† 4	.5	.5	31.9	946	4,850	31.9
Feb.			† 1	.6	† 6	.4	.5	25.8	14,534	64,300	25.8
Mar.			28	1,840	† 4	.3	519	31,900	77,312	120,000	31,900
Apr.			4	1,730	27	562	982	58,400	109,853	212,000	58,000
May			11	717	6	352	491	30,200	104,224	412,000	23,500
June			26	1,100	1	361	788	46,900	121,912	354,000	46,900
July			† 8	1,110	2	271	787	48,400	127,147	234,000	48,400
Aug.			1	708	27	2.1	334	20,500	122,724	179,000	20,500
Sept.			2	1,260	†29	.5	130	7,730	60,437	181,000	7,730
Oct.			† 1	.4	31	.1	.3	15.5	9,753	35,400	15.5
Nov.			30	.3	† 1	.1	.2	9.3	5,197	14,400	9.3
Dec.			† 6	.5	† 1	.3	.4	22.8	5,391	19,100	22.8
Yearly				1,840		.1	337	244,135.3	759,430	1,795,670	244,135.3

† And other days ø Mean daily

RIO GRANDE AT EL PASO, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights. The recorder is located 5 miles northwest of El Paso, Texas, 6 miles northwest of Juárez, Chihuahua, and 1.9 river miles above the American Dam. The cable and staff gage are located 1 mile downstream from the recorder in the pass opposite Courchesne Quarry. The zeros of the gages at the recorder and at the cable are 3,722.30 feet and 3,720.51 feet, respectively, above mean sea level, U.S.C. & G.S. datum.

RECORDS: Discharges in 1954 were computed by taking the sum of the flows in the American Canal and the flows at the station below American Dam. Records available: 1889 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 24,000 second-feet on June 12, 1905, with a gage height of 6.0 feet at the lower gage. Min. occasionally no flow. Since Elephant Butte Dam was closed in 1915, the largest peak flow to pass this station was 13,500 second-feet on September 3, 1925.

Average Flow in Second-Feet

Daily:	Max. 23,680	June 12, 1905	Min. 0		Occasionally
Monthly:	Max. 14,300	June 1905	Min. 0		Occasionally
Yearly:	Max. 2,780	1905	Min. 70.1		1902

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	54.5	48.8	* 22.0	467	302	102	314	138	31.8	* 5.0	12.0	5.4
2	54.6	48.7	u 23.7	467	340	150	311	108	99.4	330	5.8	7.5
3	54.7	48.4	u 24.0	479	329	121	296	100	164	359	10.5	7.5
4	54.8	48.2	u 25.0	526	296	156	225	104	231	66.0	10.6	6.7
5	55.4	47.9	* 25.9	565	286	124	130	119	217	32.2	10.7	8.2
6	54.2	46.0	* 20.5	615	200	121	99.4	148	* 106	18.8	12.0	7.8
7	55.2	44.1	* 20.4	584	194	126	124	471	54.6	14.9	11.8	7.8
8	56.1	43.9	* 17.8	488	171	114	139	214	29.7	591	10.4	7.7
9	53.8	43.6	* 15.9	444	161	165	210	198	23.9	146	4.9	7.9
10	54.7	41.6	* 11.1	417	168	164	291	u 91.7	17.0	123	6.3	7.8
11	54.1	38.4	* 9.3	441	169	191	358	230	15.6	38.6	9.8	7.0
12	55.0	40.1	* 10.5	390	187	190	338	* 81.6	16.1	19.0	4.5	6.6
13	55.3	39.4	* 9.7	359	214	205	372	* 74.7	13.9	13.4	9.4	7.4
14	48.9	37.4	* 10.3	334	250	265	376	* 73.6	5.9	11.9	11.7	6.9
15	52.5	35.4	* 11.8	325	275	314	367	u 29.9	* 5.8	11.3	10.0	7.9
16	51.2	37.1	* 12.4	325	236	359	391	u 19.4	* 5.7	11.2	7.4	6.7
17	54.7	37.2	* 10.0	308	252	345	414	u 8.9	* 4.8	10.9	7.2	6.6
18	54.9	33.7	* 11.4	317	330	357	414	u 16.4	* 4.2	5.3	7.1	7.0
19	53.6	28.0	* 10.4	308	366	313	358	u 22.1	* 4.1	u 4.4	7.1	7.6
20	53.7	24.4	* 9.6	262	175	303	285	* 144	* 4.3	6.8	10.8	6.1
21	53.8	28.1	* 9.2	277	134	241	198	971	4.2	5.5	11.1	5.2
22	52.3	29.1	* 11.6	276	129	210	163	* 425	3.9	6.4	11.0	6.1
23	52.5	26.3	* 11.8	256	145	199	192	* 891	* 12.1	6.5	9.2	6.2
24	47.6	27.8	* 15.9	301	164	184	228	294	u 5.8	10.1	7.0	5.8
25	47.7	27.3	* 34.1	303	162	138	361	469	38.3	6.4	9.9	6.6
26	49.5	23.3	299	317	158	198	231	215	33.9	4.7	9.3	7.8
27	49.4	19.2	354	366	157	213	* 237	u 59.8	19.3	9.0	6.9	6.8
28	50.9	19.4	346	328	137	240	u 249	u 56.2	13.8	8.8	9.9	6.6
29	52.5		394	322	130	213	* 177	u 48.3	20.3	11.5	9.2	8.0
30	50.6		485	270	113	272	157	u 40.5	16.9	12.4	8.7	7.8
31	48.9		483		95.8		155	u 33.0		10.7		8.5
Sum	1,637.6	1,012.8	2,755.3	11,437	6,425.8	6,293	8,160.4	*5,895.1	1,223.3	1,910.7	272.2	219.5

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1924-1954 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	2.66	2.24	17	67.5	24	34.6	52.8	3,250	10,277	17,500	3,250
Feb.	2.39	2.08	6	51.0	28	18.0	36.2	2,010	16,758	52,200	2,010
Mar.	3.82	1.86	31	497	11	8.6	88.9	5,470	37,381	62,500	5,470
Apr.	4.17	3.09	6	638	23	224	381	22,700	61,220	139,000	22,700
May	4.65	2.54	18	985	31	73.9	207	12,700	69,076	357,000	12,700
June	3.56	2.54	16	367	1	81.1	210	12,500	71,165	304,000	12,500
July	4.36	2.56	25	676	6	61.5	263	16,200	77,855	198,000	16,200
Aug.	6.24	2.03	21	3,690	17	* 8.4	*190	* 11,700	80,292	158,000	* 11,700
Sept.	3.07		4	261	22	Ø 3.9	40.8	2,430	58,465	171,000	2,430
Oct.	4.95	1.93	2	3,570	19	u 4.1	61.6	3,790	23,667	57,900	3,790
Nov.	2.13	1.91	14	18.2	3	1.5	9.1	540	15,515	29,500	540
Dec.	2.11	1.93	19	9.9	1	3.4	7.1	435	14,580	27,700	435
Yearly	6.24			3,690		1.5	129	93,725	536,251	1,559,200	93,725

Current Year 1954

u Estimated * Partly estimated Ø Mean daily

RIO GRANDE BELOW AMERICAN DAM

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located 3,200 feet below the American Dam and 1.5 miles above the International Dam, west of El Paso, Texas. The American Dam is 1,241.4 river miles above the Gulf of Mexico. The zero of the gage is 3,712.30 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 43 meter measurements and frequent estimates by hydrographer at extreme low flows during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: June 1, 1938 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. The operation of the American Dam began June 2, 1938. At this dam, part of the flow passing the El Paso gaging station is diverted into the American Canal (see records of "Diversions from the Rio Grande") and the remainder, including excess flood flows, passes this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 6,770 second-feet on May 18, 1942, with a gage height of 9.77 feet. Min. u .1 second-foot on November 15, 1954.

Average Flow in Second-Feet

Daily:	Max.	6,040	May 20, 1942	Min. u	.1	Nov. 15, 1954
Monthly:	Max.	4,880	May 1942	Min.	.5	Nov. 1954
Yearly:	Max.	1,510	1942	Min.	29.9	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	54.5	48.8	8.0	1.9	136	4.5	5.5	.4	5.3	1.5	1.0	4.2
2	54.6	48.7	2.1	1.9	140	3.6	3.2	.4	3.4	273	.8	7.5
3	54.7	48.4	2.0	1.9	148	3.3	1.9	.5	1.5	95.0	.7	7.5
4	54.8	48.2	2.0	1.9	153	3.4	2.2	.5	1.1	1.1	.6	6.7
5	55.4	47.9	1.9	1.8	155	4.8	2.4	.6	.6	.8	.6	8.2
6	54.2	46.0	1.9	1.8	141	5.6	* 2.6	1.3	.5	.8	.6	7.8
7	55.2	44.1	1.8	2.7	139	5.4	* 3.0	201	.5	.8	.5	7.8
8	56.1	43.9	1.8	2.2	142	5.0	* 2.8	2.4	.3	342	.5	7.7
9	53.8	43.6	1.7	1.3	140	4.7	* 2.4	1.6	.4	3.5	.5	7.9
10	54.7	41.6	1.3	.7	146	5.2	84.1	1.1	1.3	2.2	.5	7.8
11	54.1	38.4	.8	.6	144	5.8	144	1.2	2.4	.3	.4	7.0
12	55.0	40.1	.7	1.1	144	5.5	113	.5	1.8	.3	.4	6.6
13	55.3	39.4	.7	1.3	144	5.2	101	.3	1.5	.3	.4	7.4
14	48.9	37.4	.7	1.3	132	5.1	96.6	.5	2.1	.4	.4	6.9
15	52.5	35.4	1.2	103	116	4.5	95.4	2.7	2.3	.4	u .1	7.9
16	51.2	37.1	.9	145	4.0	5.1	97.4	3.0	2.7	.6	.5	6.7
17	54.7	37.2	.7	125	3.3	4.8	96.3	2.4	1.8	.6	.4	6.6
18	54.9	33.7	.5	118	3.0	5.1	92.0	1.6	1.2	.7	.4	7.0
19	53.6	28.0	.6	128	1.8	5.4	84.7	1.2	1.1	.4	.4	7.6
20	53.7	24.4	.6	139	.7	4.8	3.0	75.8	.8	.7	.4	6.1
21	53.8	28.1	.7	144	.5	5.1	2.0	514	.7	1.0	u .4	5.2
22	52.3	29.1	.7	142	.7	5.6	1.6	u 170	.6	.3	u .4	6.1
23	52.5	26.3	.9	151	1.0	5.7	2.5	u 493	8.1	.4	u .4	6.2
24	47.6	27.8	.8	154	1.3	5.3	1.8	23.8	.8	.2	.4	5.8
25	47.7	27.3	.5	152	1.6	5.4	1.0	22.8	13.3	.2	.4	6.6
26	49.5	23.3	.9	146	1.6	5.1	.6	4.2	16.0	.2	.4	7.8
27	49.4	19.2	2.1	148	1.9	5.8	.6	5.5	1.5	3.0	.4	6.8
28	50.9	19.4	1.8	145	5.7	5.3	.6	4.7	.6	4.0	.4	6.6
29	52.5		1.6	137	5.5	5.7	.6	4.3	12.5	3.1	.4	8.0
30	50.6		2.0	132	5.3	5.6	.6	4.0	13.0	2.1	.4	7.8
31	48.9		2.0		4.4		.6	3.8		.9		8.5
Sum	1,637.6	1,012.8	45.9	2,231.4	2,162.3	151.4	1,046.0	* 1,549.1	99.7	740.8	14.1	218.3

Month	Current Year 1954								Period June 1938-1954		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	4.93	4.71	17	67.5	24	34.6	52.8	3,250	7,818	12,000	3,250
Feb.	4.84	4.53	6	51.0	28	18.0	36.2	2,010	4,651	32,800	521
Mar.	4.61	4.05	1	23.7	25	.4	1.5	91.0	3,121	17,500	91.0
Apr.	5.39	4.08	15	237	10	.4	74.4	4,430	11,089	74,500	2,230
May	5.38	4.05	13	208	21	.3	69.8	4,290	29,639	300,000	4,290
June	4.21	4.07	21	7.9	2	3.1	5.0	300	25,148	250,000	300
July	5.04	3.77	†10	144	30	.4	33.7	2,070	20,504	155,000	2,070
Aug.	7.85	4.18	21	3,210	†12	.2	* 50.0	* 3,070	18,067	114,000	* 3,070
Sept.	5.38	3.85	25	222	† 8	.3	3.3	198	17,095	124,000	198
Oct.	7.90	4.01	2	3,330	†12	.2	23.9	1,470	3,508	19,000	197
Nov.	4.10	3.94	10	1.3	15	u .1	.5	28.0	2,507	8,700	28.0
Dec.	4.39	4.00	19	9.9	1	.3	7.0	433	1,603	7,760	120
Yearly	7.90			3,330		u .1	29.9	21,640	144,750	1,093,553	21,640

u Estimated * Partly estimated † And other days

RIO GRANDE AT JUAREZ, CHIHUAHUA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located 2.9 river miles downstream from El Paso, Texas and Juárez, Chihuahua. This station is 7.0 river miles below the American Dam at El Paso, Texas and 4.9 river miles below the International Dam. The zero of the gage is 3,683.98 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 150 meter measurements during the year, 142 by the Mexican and 8 by the United States Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: April 1938 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 6,600 second-feet on May 18, 1942, with a gage height of 11.15 feet. Min. 3.9 second-feet on May 15, 1954, with a gage height of 2.23 feet.

Average Flow in Second-Feet

Daily:	Max. 6,460	May 20, 1942	Min. 9.2	May 24, 1954
Monthly:	Max. 5,290	May 1942	Min. 22.1	Nov. 1954
Yearly:	Max. 1,820	1942	Min. 56.0	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	50.9	55.1	38.1	271	20.8	23.3	29.0	23.7	22.6	26.1	20.8	25.1
2	56.1	56.9	38.5	263	77.0	19.1	28.3	24.4	19.4	33.2	17.0	22.2
3	55.8	50.9	38.5	246	129	20.8	21.9	22.3	20.1	169	17.7	25.4
4	55.8	50.1	38.1	297	109	21.5	19.8	22.6	19.8	44.1	16.2	25.8
5	62.5	54.7	33.9	326	101	22.2	18.7	21.9	18.4	28.3	19.4	22.2
6	62.9	48.7	33.2	371	56.9	21.5	19.4	34.3	20.8	33.9	22.2	24.7
7	56.5	49.4	27.2	313	40.6	25.4	21.5	225	18.0	30.0	23.0	27.5
8	56.9	49.8	25.1	195	26.5	27.9	20.8	41.0	14.1	120	26.8	30.4
9	46.3	50.9	27.9	105	21.9	25.8	21.9	78.4	13.8	38.5	25.1	31.4
10	46.6	57.2	24.4	102	23.7	24.0	19.8	38.1	15.2	20.1	23.3	26.1
11	52.6	50.9	24.4	115	23.7	21.9	21.5	30.4	18.7	22.6	23.0	24.0
12	53.0	50.5	21.2	136	19.4	18.7	25.4	24.7	21.5	22.2	22.6	18.7
13	53.3	49.8	24.4	215	21.5	22.6	23.7	24.4	23.0	21.9	22.6	21.5
14	47.7	46.3	26.8	189	21.9	151	24.0	21.9	19.4	17.7	23.7	21.2
15	59.7	42.7	33.5	130	21.2	230	26.1	24.4	17.7	16.2	25.1	23.7
16	54.4	52.3	38.1	79.5	22.6	306	26.1	26.5	16.2	17.0	25.4	20.5
17	51.9	52.3	35.0	39.2	32.8	294	25.8	23.4	19.4	19.1	22.6	23.3
18	54.7	54.7	33.2	26.1	135	288	30.0	23.4	20.1	21.5	25.1	20.5
19	60.0	51.6	35.3	30.4	198	273	32.1	* 26.1	18.7	21.2	24.7	18.0
20	48.4	47.7	29.3	38.1	168	154	29.3	u 41.7	22.6	23.7	24.0	23.3
21	50.9	48.7	20.8	27.5	115	43.4	27.5	381	21.9	23.3	23.7	20.5
22	53.3	56.1	21.5	32.8	91.1	18.0	23.0	143	21.9	23.3	20.1	23.3
23	55.8	36.4	22.2	22.6	65.0	14.8	26.8	1,400	28.3	23.0	19.8	26.1
24	48.7	28.3	29.0	16.6	9.2	17.3	27.5	389	28.3	19.8	22.2	26.1
25	42.4	28.3	29.0	20.8	13.8	19.8	127	360	33.5	18.7	22.6	29.7
26	41.0	28.3	128	18.0	27.2	25.1	28.6	238	72.0	21.2	23.3	29.7
27	44.5	25.4	140	109	47.7	22.2	26.8	61.5	28.6	21.2	24.0	26.1
28	50.5	30.0	145	60.0	25.4	25.4	25.4	26.1	22.2	19.8	21.9	18.0
29	50.9		157	51.6	19.4	21.9	24.0	21.6	22.2	21.5	17.7	20.5
30	63.6		261	21.5	21.5	23.0	24.4	20.1	22.2	20.1	18.4	23.3
31	53.7		290		28.6		25.8	20.5		19.1		23.3
Sum	1,641.3	1,304.0	1,869.6	3,867.7	1,734.4	2,221.6	871.9	3,859.4	680.6	977.3	664.0	742.1

u Estimated * Partly estimated † And other days

Month	Current Year 1954								Period Apr. 1938-1954		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	3.08	2.85	22	73.8	10	37.1	52.9	3,260	9,450	13,270	3,260
Feb.	3.08	2.79	1	75.9	†24	22.6	46.6	2,590	9,079	42,690	2,110
Mar.	4.07	2.66	30	305	22	19.1	60.3	3,710	23,681	45,790	3,710
Apr.	4.46	2.23	6	420	26	8.5	129	7,670	36,636	111,500	7,670
May	4.46	2.23	19	491	15	3.9	55.9	3,440	41,622	325,100	3,440
June	4.30	2.53	16	337	23	13.1	74.1	4,410	45,262	272,400	4,410
July	4.30	2.33	25	392	6	13.1	28.1	1,730	45,992	162,500	1,730
Aug.	7.94	2.43	23	6,290	3	17.7	124	7,660	44,722	127,300	7,660
Sept.	4.33	2.40	26	364	9	6.7	22.7	1,350	32,944	143,800	1,350
Oct.	4.72	2.36	3	583	10	9.9	31.5	1,940	14,678	45,390	1,940
Nov.	2.62	2.33	11	33.2	1	10.2	22.1	1,320	7,967	13,670	1,320
Dec.	2.66	2.43	17	32.8	16	13.8	23.9	1,470	8,266	18,060	1,470
Yearly	7.94	2.23		6,290		3.9	56.0	40,550	320,299	1,315,890	40,550

RIO GRANDE AT ISLAND STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located near Clint, Texas and San Agustín, Chihuahua. This station is on the rectified channel of the Rio Grande 27.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,608.99 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 21 meter measurements during the year, 17 by the United States and 4 by the Mexican Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: August 17, 1938 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 6,490 second-feet on May 19, 1942, with a gage height of 16.06 feet. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max. 6,140	May 19, 1942	Min. 0	Frequently	
Monthly:	Max. 4,880	May 1942	Min. 0	Several months 1951, 1953 & 1954	
Yearly:	Max. 1,490	1942	Min. 7.9	1952	

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.5	34.5	1.6	9.1	0	0	0	0	0	0	0	0
2	36.0	37.7	1.1	6.1	0	0	0	0	0	.5	0	0
3	38.3	38.7	.8	5.8	0	0	0	0	0	3.0	0	0
4	38.3	39.4	.6	* 5.4	0	0	0	0	0	0	0	0
5	23.4	39.2	.5	* 5.1	0	0	0	0	0	0	0	0
6	36.0	39.0	.1	* 5.1	ᵾ .4	0	0	0	0	0	0	0
7	35.1	37.9	0	* 4.4	ᵾ .2	0	0	0	0	0	0	0
8	37.8	36.8	0	3.4	ᵾ .1	0	0	0	0	0	.5	0
9	31.9	37.5	.2	3.6	0	0	0	0	0	0	1.8	0
10	31.4	37.3	.1	3.2	0	0	0	0	0	0	2.3	0
11	32.6	35.2	.1	3.0	0	0	0	0	0	0	3.7	0
12	32.1	33.0	0	4.2	0	0	0	0	0	0	5.0	0
13	34.3	32.7	0	6.1	0	0	0	0	0	0	6.1	0
14	34.7	30.8	0	4.0	0	0	0	0	0	0	7.0	0
15	35.2	26.7	0	2.2	0	0	0	0	0	0	8.2	0
16	37.4	9.9	0	1.7	0	0	0	0	0	0	9.3	0
17	36.9	5.0	0	9.5	0	0	0	0	0	0	9.9	0
18	36.5	3.7	0	9.1	0	0	0	0	0	0	10.6	0
19	39.8	2.4	0	3.5	0	0	0	0	0	0	11.5	0
20	38.6	1.7	0	2.9	0	0	0	0	0	0	11.9	0
21	37.6	ᵾ 1.9	0	1.8	0	0	0	ᵾ 0	0	0	11.8	0
22	37.8	ᵾ 2.1	0	1.3	0	0	0	ᵾ 185	0	0	11.7	0
23	37.0	ᵾ 2.3	0	.6	0	0	0	* 917	0	0	13.0	0
24	33.4	2.5	0	ᵾ .1	0	0	0	103	0	0	13.4	0
25	30.7	2.5	0	0	0	0	0	42.1	0	0	3.4	0
26	29.1	2.7	2.4	0	0	0	0	1.1	0	0	2.2	0
27	27.7	1.9	10.4	0	0	0	0	0	0	0	.8	0
28	27.4	1.8	6.8	0	0	0	0	0	0	0	0	0
29	28.7		6.3	0	0	0	0	0	0	0	0	0
30	30.7		* 6.2	0	0	0	0	0	0	0	0	0
31	34.0		* 5.6		0		0	0		0		.3
Sum	1,051.9	576.8	* 42.8	101.2	ᵾ .7	0	0	* 1,248.2	0	3.5	144.1	.3

Month	Current Year 1954								Period Sept. 1938-1954		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	9.89	9.57	4	41.7	5	14.1	33.9	2,090	7,549	11,900	2,020
Feb.	9.79		5	42.0	20	Ø 1.7	20.6	1,140	5,831	37,000	161
Mar.	9.44		27	17.6	† 6	0	* 1.4	* 84.9	3,931	21,000	20.2
Apr.	9.65		17	28.2	†24	0	3.4	201	7,182	70,500	5.0
May	8.70		6	1.5	† 1	0	0	ᵾ 1.4	21,236	299,800	ᵾ 1.4
June				0		0	0	0	17,950	241,000	0
July				0		0	0	0	13,790	* 118,500	0
Aug.	12.22		23	1,990	† 1	0	* 40.3	* 2,480	12,699	99,400	277
Sept.				0		0	0	0	14,758	* 119,200	0
Oct.	9.54		3	16.6	† 1	0	.1	6.9	6,668	42,800	0
Nov.	9.51		24	15.1	† 1	0	4.8	286	1,581	7,270	0
Dec.	9.04		31	1.4	† 1	0	0	.6	3,063	12,900	0
Yearly	12.22			1,990		0	* 8.7	* 6,290.8	116,238	1,079,340	5,708.5

ᵾ Estimated * Partly estimated † And other days Ø Mean daily

RIO GRANDE AT COUNTY LINE STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located .8 mile downstream from the El Paso-Hudspeth county line. This station is on the rectified channel of the Rio Grande 47.3 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,547.59 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on meter measurements made in 1953, the gage height of zero flow, and a continuous record of gage heights. No current meter measurements were made during the four days in 1954 when flow occurred at this station. Records available: January 1, 1938 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 6,340 second-feet on May 19, 1942, with a gage height of 8.66 feet. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max. 6,180	May 18, 1942	Min. 0		Frequently
Monthly:	Max. 4,920	May 1942	Min. 0		Frequently
Yearly:	Max. 1,720	1942	Min. .5		1952 & 1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	24.0	0	0	0	0
24	0	0	0	0	0	0	0	149	0	0	0	0
25	0	0	0	0	0	0	0	E 2.0	0	0	0	0
26	0	0	0	0	0	0	0	E 1.0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0		0	0	0	0	0	0	0	0	0	0
30	0		0	0	0	0	0	0	0	0	0	0
31	0		0		0		0	0		0		0
Sum	0	0	0	0	0	0	0	176.0	0	0	0	0

Current Year 1954 — Period 1938-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.				0		0	0	0	11,646	20,000	0
Feb.				0		0	0	0	10,059	47,900	0
Mar.				0		0	0	0	8,818	38,900	0
Apr.				0		0	0	0	13,343	84,200	0
May				0		0	0	0	25,719	303,000	0
June				0		0	0	0	22,719	239,000	0
July				0		0	0	0	20,834	140,000	0
Aug.	4.70		24	357		0	5.7	349	19,909	123,000	0
Sept.				0		0	0	0	22,754	140,000	0
Oct.				0		0	0	0	15,173	61,400	0
Nov.				0		0	0	0	10,252	20,400	0
Dec.				0		0	0	0	11,293	29,700	0
Yearly	4.70			357		0	.5	349	192,519	1,247,500	347.5

E Estimated

RIO GRANDE AT FORT QUITMAN, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located on the rectified channel of the Rio Grande 1.5 miles below Old Fort Quitman, and 81.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 3,450.57 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 33 meter measurements during the year, 28 by the United States and 5 by the Mexican Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: January 1923 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 10,600 second-feet on October 5, 1946, with a gage height of 10.00 feet. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max. 5,890	May 19, 1942	Min. 0		Frequently
Monthly:	Max. 5,030	May 1942	Min. 0		April & May 1952
Yearly:	Max. 1,750	1942	Min. 15.3		1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.6	2.5	2.0	.2	.3	2.7	.4	ᵘ 8.3	7.0	1.0	.8
2	2.3	2.5	2.4	2.0	.2	.2	.2	3.2	ᵘ 3.0	801	1.0	.7
3	2.3	2.6	2.5	1.8	.2	.2	.2	1.1	ᵘ 8.0	ᵘ 37.8	1.0	.7
4	2.8	3.0	2.6	1.3	.2	.4	.2	.4	ᵘ 4.0	* 22.8	1.0	.7
5	2.3	3.0	2.7	1.1	.2	.4	.2	.9	ᵘ 1.5	* 15.9	1.0	.7
6	2.3	3.2	2.6	1.1	.2	.2	.2	761	ᵘ 1.5	72.8	1.0	.7
7	2.4	3.3	2.6	1.1	.2	.1	1.0	60.0	ᵘ 1.5	* 38.7	1.2	.7
8	3.2	3.1	2.5	1.2	.2	.1	.9	41.0	1.5	* 1.4	1.3	.7
9	2.8	3.1	2.5	1.0	.2	0	.3	66.0	* 1.5	1.4	1.3	.7
10	2.7	3.4	2.6	1.0	.2	0	.3	23.5	* 1.5	1.3	1.4	.7
11	2.3	3.2	2.4	.9	.2	0	.2	ᵘ 3.0	* 1.5	1.2	1.4	.7
12	2.3	3.2	2.3	1.0	.2	0	0	1.0	* 1.5	1.1	1.3	.7
13	2.3	3.2	2.2	1.2	.2	0	0	.9	* 1.5	1.0	1.4	.7
14	2.5	3.1	2.0	35.6	.2	0	0	.8	* 1.5	1.0	1.4	.7
15	2.6	3.2	1.8	1.9	.2	0	.1	.7	* 1.5	1.0	1.4	.7
16	2.6	3.1	1.7	.9	142	0	.2	.6	* 1.4	1.0	1.3	.7
17	2.7	3.1	1.6	.7	64.8	0	1.5	.5	* 1.3	1.0	1.3	.7
18	2.7	3.1	1.8	.6	149	0	5.0	4.9	* 1.2	1.0	1.3	.7
19	2.8	2.9	2.0	.5	198	0	1.2	7.9	* 1.1	1.0	1.2	.7
20	3.0	2.9	2.1	.6	166	0	6.1	33.6	* 1.0	1.0	1.2	.7
21	3.3	2.8	2.2	.8	88.2	.1	146	98.0	* .9	1.0	1.1	.7
22	3.0	2.8	2.3	.8	13.4	1.3	450	549	.8	1.0	1.1	.7
23	3.0	2.7	2.5	.8	1.4	.1	3.5	1,070	.8	1.0	1.0	.7
24	2.9	2.8	2.6	.8	.8	0	.4	* 664	.8	1.0	1.0	.7
25	2.8	2.8	2.5	.6	.8	0	.4	* 205	.8	1.0	1.0	.7
26	2.8	2.6	2.3	.4	.8	0	.4	166	.8	1.0	1.0	.7
27	2.8	2.7	2.2	.2	.6	0	.4	173	.8	1.0	.9	.7
28	3.2	2.6	2.2	.2	.4	0	.4	150	1.2	1.0	.9	.7
29	2.8		2.1	.2	.4	185	.4	117	.8	1.0	.9	.7
30	2.8		2.1	.2	.4	106	.4	77.0	.8	1.0	.8	.7
31	2.7		2.0		.2		.4	38.2		1.0		.7
Sum	83.3	82.6	70.4	62.5	830.2	294.4	623.2	4,318.6	* 54.3	1,021.4	34.1	21.8

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	2.84	2.63	28	5.0	3	1.9	2.7	165	11,778	20,900	165
Feb.	2.74	2.66	10	3.4	3	2.3	3.0	164	11,674	50,100	164
Mar.	2.72	2.65	5	2.9	17	1.5	2.3	140	9,674	38,900	140
Apr.	3.55	2.49	14	154	†27	.2	2.1	124	12,019	* 77,000	0
May	4.55	2.66	16	930	† 1	.2	26.8	1,650	21,812	309,000	0
June	5.78		29	2,140	† 8	0	9.8	584	19,859	240,000	ᵘ 20.2
July	6.86		21	2,870	†11	0	20.1	1,240	20,682	140,000	973
Aug.	7.15		6	3,250	† 1	ᵘ .4	139	8,570	25,443	* 127,000	185
Sept.			1	ᵍᵘ 8.3	†22	ᵍ .8	* 1.8	* 108	28,680	147,000	* 108
Oct.	7.41	3.20	2	2,120	1	.8	32.9	2,030	21,222	66,500	51.6
Nov.	3.65	3.57	†10	ᵍ 1.4	30	ᵍ .8	1.1	67.6	13,650	24,500	67.6
Dec.	3.63	3.62	1	.8	† 2	.7	.7	43.2	14,131	31,000	43.2
Yearly				3,250		0	20.6	14,885.8	210,624	1,270,400	11,129

ᵘ Estimated * Partly estimated † And other days ᵍ Mean daily

RIO GRANDE AT UPPER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located 7.8 river miles above the confluence of the Río Conchos, about 10 miles northwest of Presidio, Texas and Ojinaga, Chihuahua, and 285.7 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,576.66 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 36 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to March 1914 and August 1923 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 14,000 second-feet on June 14, 1905. A gage height of 10.57 feet was recorded on May 26, 1942, with a flow of 5,160 second-feet. This level was the highest reached during the years 1923-1954, inclusive. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max.	13,700	June 13 & 14, 1905	Min.	0	Frequently
Monthly:	Max.	10,150	June 1905	Min.	0	Frequently
Yearly:	Max.	1,970	1907	Min.	12.5	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	0	0	661	0	336	.4	.3	0
2	0	0	0	0	0	0	454	.1	474	.4	0	0
3	0	0	0	0	0	0	554	30.5	* 438	.3	0	0
4	0	0	0	0	0	19.3	159	283	u 203	61.5	0	0
5	0	0	0	0	0	567	8.2	51.0	u 134	577	0	0
6	0	0	0	0	0	385	2.3	16.1	u 92.9	632	0	0
7	0	0	0	0	0	39.7	1.2	242	* 40.6	626	0	0
8	0	0	0	0	0	5.6	1.8	246	25.1	684	0	0
9	0	0	0	0	0	2.8	.1	409	8.5	714	0	0
10	0	0	0	0	0	.6	0	142	6.1	742	0	0
11	0	0	0	0	0	.2	0	167	10.4	350	0	0
12	0	0	0	0	0	163	0	277	6.9	109	0	0
13	0	0	0	0	0	435	0	u 72.8	4.9	75.8	0	0
14	0	0	0	0	0	684	0	u 3.5	4.0	51.2	0	0
15	0	0	0	0	0	425	0	u 2.2	2.9	22.1	0	0
16	0	0	0	134	0	315	0	* .8	3.8	16.3	0	0
17	0	0	0	11.5	0	* 44.9	0	.5	4.0	13.2	0	0
18	0	0	0	0	0	3.1	0	.7	1.1	14.6	0	0
19	0	0	0	0	.6	0	0	.2	1.4	3.7	0	0
20	0	0	0	0	215	0	0	364	.9	3.6	0	0
21	0	0	0	0	208	0	0	501	72.1	2.0	0	0
22	0	0	0	0	365	0	0	540	113	1.3	0	0
23	0	0	0	0	42.4	0	0	794	3.8	2.2	0	0
24	0	0	0	0	1.2	0	0	922	2.5	2.1	0	0
25	0	0	0	0	.7	0	0	950	1.5	1.6	0	0
26	0	0	0	0	.1	0	0	951	1.3	1.3	0	0
27	0	0	0	0	0	0	0	977	1.0	.3	0	0
28	0	0	0	0	0	5.6	0	1,040	.9	1.3	0	0
29	0		0	0	0	1.2	0	1,110	.7	1.0	0	0
30	0		0	0	0	108	0	1,140	.5	.4	0	0
31	0		0		0		0	912		.3		0
Sum	0	0	0	145.5	833.0	3,205.0	1,841.6	12,145.4	4,710.9 *1,995.8		.3	0

Month	Current Year 1954 Extreme Gage Feet High	Low	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1924-1954 Acre-Feet Average	Maximum	Minimum
Jan.						0	0	0	10,979	24,400	0
Feb.						0	0	0	10,169	40,800	0
Mar.						0	0	0	8,059	39,100	0
Apr.	4.65		16	216	† 1	0	4.8	289	6,631	41,600	0
May	7.58		20	540	† 1	0	26.9	1,650	15,892	240,000	0
June	10.28		14	901	† 1	0	107	6,360	15,628	216,000	* 218
July	9.95		1	850	† 9	0	59.4	3,650	21,590	158,000	* 13.1
Aug.	12.60		29	1,220	† 1	0	392	24,100	27,970	133,000	120
Sept.	8.63	2.68	3	641	21	.4	* 66.5	* 3,960	31,168	* 151,000	0
Oct.	9.86		10	754	4	0	152	9,340	26,713	105,000	0
Nov.	2.64		1	.3	† 2	0	0	.6	12,787	34,500	0
Dec.						0	0	0	12,422	30,900	0
Yearly	12.60			1,220		0	68.2	49,349.6	200,008	1,176,700	9,085

u Estimated * Partly estimated † And other days

RIO CONCHOS AT CUCHILLO PARADO, CHIHUAHUA

DESCRIPTION: Water-stage recorder and cable with cable car, located in Salineta Canyon, 3.1 miles north of the town of Cuchillo Parado, Chihuahua, 28.6 air-line miles westward from Ojinaga, Chihuahua, and 49.1 river miles above the confluence of the Río Conchos with the Rio Grande. This confluence is 293.5 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,914.23 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 153 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: January 1, 1945 through December 1954.

REMARKS: The flow of this stream is modified by irrigation diversions and drainage returns and by the operation of La Rosetilla, La Colina, and La Boquilla reservoirs situated 139, 194, and 202 river miles, respectively, above this station and also by Madero Reservoir on the Río San Pedro, which enters the Río Conchos 145 river miles above this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 39,200 second-feet on July 12, 1952, with a gage height of 17.19 feet. Min. .7 second-foot on July 13, 1953, with a gage height of 2.30 feet.

Average Flow in Second-Feet

Daily:	Max.	19,950	July 13, 1952	Min.	.7	July 13, 1953
Monthly:	Max.	3,580	Sept. 1946	Min.	7.5	Apr. 1953
Yearly:	Max.	972	1946	Min.	176	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	192	166	159	25.4	37.1	19.4	445	46.3	2,160	466	319	206
2	184	154	173	22.6	33.2	17.3	191	33.2	1,800	636	337	197
3	183	149	194	18.4	28.6	17.0	155	696	1,940	865	312	197
4	174	147	187	19.1	21.9	14.1	240	256	2,520	904	255	187
5	190	151	190	19.4	16.6	9.2	322	231	1,770	812	268	186
6	190	152	215	14.1	15.2	9.5	260	296	1,010	798	230	186
7	202	161	214	6.4	13.1	9.9	248	282	1,010	1,100	233	185
8	191	204	197	6.7	8.5	9.2	441	191	801	667	221	184
9	180	276	181	6.4	6.7	7.1	302	925	699	572	403	183
10	192	263	167	4.9	6.7	7.4	312	777	597	1,190	308	173
11	182	246	136	4.2	5.3	7.8	682	274	512	780	253	181
12	175	271	115	7.1	5.3	98.2	272	378	410	519	254	226
13	175	280	95.7	8.8	5.7	28.6	308	288	303	389	345	239
14	197	310	95.0	13.4	8.8	18.7	431	334	281	349	374	197
15	189	374	99.9	12.7	10.6	14.5	717	197	282	280	530	187
16	183	374	98.2	11.7	12.4	14.8	735	173	242	268	406	186
17	201	305	109	9.9	12.0	11.7	735	131	202	269	299	194
18	202	242	97.5	5.7	15.9	9.2	427	198	202	244	264	247
19	199	219	86.9	5.7	12.0	7.1	299	1,380	200	233	227	299
20	196	208	83.3	13.1	57.9	8.1	203	1,620	173	223	227	271
21	201	281	78.8	19.8	110	3.9	178	1,720	367	223	256	220
22	184	289	86.9	17.0	34.3	2.1	277	9,890	505	210	229	196
23	194	205	86.2	18.4	25.8	1.4	189	8,330	2,180	188	216	196
24	188	175	79.1	19.8	25.8	1.1	113	11,480	1,310	196	204	178
25	245	155	62.5	334	27.9	3.5	278	4,870	784	278	218	196
26	235	150	50.9	212	24.4	2.1	188	3,030	484	224	204	237
27	205	151	51.6	94.6	23.7	194	97.1	3,110	494	252	203	196
28	187	150	51.9	65.0	16.6	234	112	4,520	727	229	192	196
29	170		40.3	69.6	11.7	97.1	122	4,060	417	275	228	186
30	171		25.8	53.3	14.5	484	105	2,810	334	328	217	186
31	172		21.2		14.5		63.9	2,050		324		186
Sum	5,929	6,208	3,528.7	1,139.2	662.7	1,362.0	9,448.0	64,576.5	24,716	14,291	8,232	6,284

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
	Current Year 1954								Period 1945-1954		
Jan.	3.81	3.44	25	266	31	165	191	11,760	34,851	55,810	11,760
Feb.	4.27	3.38	16	456	3	142	222	12,310	36,856	62,420	11,210
Mar.	3.67	2.69	6	238	31	18.0	114	7,000	31,608	49,780	7,000
Apr.	4.46	2.36	25	583	11	4.2	38.0	2,260	12,594	29,110	448
May	4.40	2.40	20	523	12	4.2	21.4	1,310	14,291	36,080	1,310
June	6.76	2.26	30	2,960	24	1.1	45.4	2,700	23,246	54,920	2,700
July	6.50	2.89	1	2,600	31	45.2	305	18,740	71,814	193,000	11,570
Aug.	13.78	2.69	22	22,780	2	24.4	2,080	128,100	57,649	142,100	10,550
Sept.	6.79	3.48	23	3,300	20	173	824	49,020	73,312	213,300	7,150
Oct.	6.04	3.58	7	2,040	24	187	461	28,350	60,415	180,200	8,180
Nov.	4.40	3.54	15	689	29	182	274	16,330	37,371	62,870	10,920
Dec.	4.10	3.51	19	420	12	171	203	12,460	27,204	45,570	10,710
Yearly	13.78	2.26		22,780		1.1	401	290,340	481,211	703,660	127,458

RIO CONCHOS NEAR OJINAGA, CHIHUAHUA

DESCRIPTION: Water-stage recorder with stand-up cable car and winch, located 1.9 miles west of Ojinaga, Chihuahua, 3.7 miles west of Presidio, Texas, and 1.5 miles upstream from the confluence with the Rio Grande. The Río Conchos enters the Rio Grande 2.0 miles above the Lower Presidio gaging station on the Rio Grande, 7.8 miles below the Upper Presidio gaging station on the Rio Grande, and 293.5 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,569.48 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 207 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Prior to April 4, 1954, records are based on discharge records of the Rio Grande at Upper Presidio and Lower Presidio stations and estimated diversions and arroyo inflow between these two stations. Records available: May 1900 to March 1914 and August 1923 through December 1954.

REMARKS: This is a new gaging station. Reservoirs, diversions, and drainage returns modify the river flow at this station. La Colina Reservoir, with 19,500 acre-feet capacity and a maximum surface area of 1,160 acres, located about 7.5 miles downstream from La Boquilla Dam, and La Rosetilla Reservoir, located about 55.9 miles farther downstream, with a capacity of 15,400 acre-feet and a maximum surface area of 840 acres, are used for power development. Francisco I. Madero Reservoir, located on the Río San Pedro, a tributary to the Río Conchos, has a capacity of about 344,550 acre-feet. Power generation facilities: La Boquilla 14,647 kw., La Colina 3,620 kw., La Rosetilla 5,150 kw., Francisco I. Madero None.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 162,000 second-feet on September 11, 1904. Min. no flow several days in May, June, and July 1953.

Average Flow in Second-Feet

Daily:	Max.	148,900	Sept. 11, 1904	Min.	0	Several days 1953
Monthly:	Max.	24,540	Sept. 1904	Min.	11.0	May 1902
Yearly:	Max.	3,720	1914	Min.	155	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				‡ 17.8	16.6	2.5	1,020	17.7	2,240	346	280	202
2				‡ 6.8	13.8	1.8	131	15.5	2,120	480	268	172
3				‡ 6.0	8.1	1.1	57.9	925	1,930	600	290	169
4				4.6	6.0	1.4	60.0	576	2,170	586	250	152
5				4.6	6.0	41.7	71.7	170	2,290	844	225	158
6				5.3	5.3	88.3	144	246	1,390	975	230	163
7				4.9	4.9	12.7	118	176	1,050	908	216	146
8				4.9	3.5	7.4	182	198	975	742	204	147
9				4.2	3.5	2.5	320	124	802	466	206	143
10				4.9	3.5	1.4	209	904	660	675	339	139
11				4.9	3.2	1.4	347	406	597	936	244	140
12				4.2	3.2	2.5	452	177	537	614	218	132
13				3.2	2.8	1.8	209	181	378	420	216	181
14				3.2	2.8	1.4	178	168	305	345	284	191
15				3.2	2.8	1.8	378	178	353	284	320	166
16				12.4	3.2	1.0	657	106	267	267	367	154
17				4.2	6.7	1.4	706	85.5	231	260	306	145
18				3.2	4.2	.7	473	57.2	192	240	248	160
19				2.8	2.5	1.0	289	295	179	238	230	191
20				2.5	374	1.0	175	2,270	192	206	210	247
21				1.8	162	1.0	109	4,980	188	194	199	230
22				2.5	57.9	.7	245	3,850	540	207	209	195
23				2.5	37.1	.7	254	11,900	805	195	178	176
24				94.6	11.3	.7	103	9,460	1,410	182	177	160
25				7.4	4.9	.7	46.3	9,360	872	178	169	151
26				78.0	5.3	.7	51.9	3,220	629	231	187	152
27				97.1	9.9	2.5	93.9	3,710	452	185	167	179
28				38.1	6.7	61.8	55.4	3,600	572	190	168	170
29				21.2	6.7	98.5	147	3,710	512	194	161	155
30				15.5	4.6	41.3	63.2	3,420	378	200	202	162
31					3.5		26.8	2,020		268		178
Sum		‡ 5,369		466.5		383.4		66,505.9		12,656		5,206
	‡ 5,820		‡ 2,726.0		786.5		7,373.1		25,216		6,968	

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan. ‡			27	274	9	129	188	11,500	53,877	147,000	11,500
Feb. ‡			17	361	27	90.7	192	10,600	47,258	87,700	10,600
Mar. ‡			8	219	2	11.0	87.9	5,410	42,134	80,800	5,410
Apr.	4.53	2.43	24	537	21	.7	15.6	925	28,228	79,700	855
May	5.84	2.53	20	1,040	19	2.5	25.4	1,560	33,991	148,000	1,560
June	4.66	2.43	5	477	†18	.7	12.8	760	39,975	91,900	760
July	6.79	2.62	1	1,860	31	26.8	238	14,620	88,188	502,000	8,890
Aug.	16.40	2.56	25	13,670	† 1	15.5	2,150	131,900	118,531	601,000	7,660
Sept.	7.51	3.71	1	2,690	21	154	841	50,020	233,922	1,173,000	6,770
Oct.	7.28	3.74	6	2,050	†24	173	408	25,100	144,138	798,000	5,890
Nov.	4.53	3.67	15	498	29	151	232	13,820	56,395	110,000	9,510
Dec.	4.20	3.54	20	305	11	128	168	10,330	48,895	97,700	9,940
Yearly				13,670		.7	382	276,545	935,532	2,431,850	111,885

† And other days ‡ Based on discharge at Lower Presidio and estimated irrigation diversions.

RIO GRANDE AT LOWER PRESIDIO STATION

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located about 1.7 miles above the international highway bridge between Presidio, Texas and Ojinaga, Chihuahua, 2.0 miles below the confluence of the Río Conchos with the Rio Grande, and 295.5 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,556.42 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 116 meter measurements during the year, 113 by the United States and 3 by the Mexican Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to July 1915 and August 1923 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 162,000 second-feet on September 11, 1904. Min. 0 occasionally in 1953.

Average Flow in Second-Feet

Daily:	Max.	149,200	Sept. 11, 1904	Min.	.1	May 10, 1953
Monthly:	Max.	24,870	Sept. 1904	Min.	7.8	Apr. 1953
Yearly:	Max.	4,870	1906	Min.	163	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	182	167	119	19.8	22.1	3.6	1,820	15.3	2,670	345	316	211
2	187	170	108	8.8	15.6	4.4	693	10.8	2,430	490	318	200
3	176	167	113	8.0	12.8	4.2	593	1,050	2,170	662	326	201
4	169	152	173	5.4	11.4	4.0	324	875	2,370	644	285	185
5	162	146	187	4.8	12.9	685	85.5	303	2,190	1,380	249	186
6	181	149	152	3.4	10.3	580	123	275	1,510	1,660	265	184
7	166	152	189	4.8	6.2	99.8	115	365	1,170	1,630	244	181
8	194	152	205	4.3	5.3	16.6	206	401	1,130	1,590	235	174
9	166	174	188	12.0	5.0	3.4	308	568	786	1,310	224	174
10	159	219	159	4.8	6.9	1.0	221	1,080	661	1,470	354	174
11	161	226	150	6.2	2.9	1.0	294	599	562	1,520	284	167
12	171	200	125	11.0	3.0	37.8	473	321	510	815	248	159
13	171	261	109	4.8	2.1	419	180	305	443	586	253	* 216
14	168	266	95.6	6.0	2.2	710	168	164	360	470	317	244
15	193	278	78.9	7.6	2.3	406	352	156	304	393	344	205
16	186	297	71.6	80.1	1.7	388	660	112	292	333	422	184
17	179	312	70.5	39.4	2.4	48.5	732	91.8	253	322	345	173
18	198	271	57.7	5.1	35.6	5.8	498	61.1	228	314	291	183
19	193	196	41.6	7.6	149	1.8	334	201	212	274	254	226
20	193	167	39.2	1.5	589	1.7	192	2,260	213	244	239	274
21	176	154	36.8	2.9	484	1.5	129	* 5,350	206	238	234	246
22	201	214	31.8	7.0	422	1.3	321	4,520	800	243	243	201
23	195	235	23.5	3.4	201	1.3	313	*12,200	937	233	221	186
24	214	175	22.9	83.2	31.2	.7	101	*10,900	1,670	230	210	187
25	197	137	20.0	11.9	8.1	.7	60.3	*11,300	1,070	222	200	186
26	256	120	24.2	73.0	5.8	.9	49.9	* 4,140	664	264	200	184
27	259	106	24.2	108	5.8	.8	90.9	* 4,990	487	227	202	212
28	224	114	23.3	46.0	4.9	34.9	52.7	4,640	574	224	206	195
29	200		21.2	29.0	4.3	80.4	115	4,980	571	236	198	181
30	194		32.8	22.5	4.6	90.7	60.6	4,720	408	244	213	181
31	180		30.0		4.0		22.4	* 2,920		311		194
Sum	5,851	5,377	2,722.8	632.3	2,074.4	3,634.8	9,687.3	*79,874.0	27,851	19,124	7,940	6,054

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	1.91	1.50	27	274	9	129	189	11,600	64,945	164,000	11,600
Feb.	2.20	1.34	17	361	27	90.7	192	10,700	57,425	99,700	10,700
Mar.	1.78	.87	8	219	29	11.0	87.8	5,400	50,150	89,400	5,400
Apr.	2.27	.67	24	409	†20	.2	21.1	1,250	34,303	84,100	464
May	4.23	.67	20	1,160	18	1.2	66.9	4,110	49,608	270,000	1,760
June	4.52	.64	5	1,350	25	.1	121	7,210	55,313	267,000	4,540
July	u 7.06	1.65	1	u 3,060	31	21.2	312	19,200	109,062	564,000	8,910
Aug.	14.59	1.52	25	14,200	2	8.2	*2,580	* 158,000	146,174	675,000	10,200
Sept.	7.02	2.42	1	3,290	21	174	928	55,200	265,141	1,324,000	7,370
Oct.	6.17	2.52	6	2,550	28	212	617	37,900	170,966	864,000	6,050
Nov.	3.25	2.43	16	494	29	185	265	15,700	69,252	141,000	9,510
Dec.	2.90	2.31	20	328	†11	159	195	12,000	61,365	116,000	9,940
Yearly	14.59	.64		14,200		.1	* 467	* 338,270	1,133,704	3,466,700	117,734

u Estimated * Partly estimated † And other days

ALAMITO CREEK NEAR PRESIDIO, TEXAS

DESCRIPTION: Water-stage recorder, about 1,800 feet above the confluence with the Rio Grande, and 6 miles below Presidio, Texas and Ojinaga, Chihuahua. This creek enters the Rio Grande near the lower end of Presidio Valley and 306.9 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,541.61 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 57 meter measurements of low and medium flows, a high flow rating curve determined by slope-area calculations, and a continuous record of gage heights. Computations by shifting channel methods. Records available: January 1932 through December 1954.

REMARKS: A small irrigation reservoir (San Estaban), 10.5 miles south of Marfa, Texas, and irrigation diversions below the reservoir modify the flow of this spring-fed creek. On October 2, 1932, backwater from the Rio Grande reached a gage height of 8.33 feet at this station. This is the highest recorded gage height.

EXTREME FLOWS FROM RECORDS: Momentary: Max. * 15,200 second-feet on June 5, 1954, with a gage height of 7.18 feet. Min. Ø .1 second-foot on July 25, 1953.

Average Flow in Second-Feet

Daily:	Max.	3,290	Oct. 24, 1941	Min.	.1	July 25, 1953
Monthly:	Max.	329	Sept. 1936	Min.	.6	Oct., Nov., Dec. 1953
Yearly:	Max.	55.9	1941	Min.	* 4.3	1951

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.8	.8	.7	.7	.7	.7	1.5	2.8	5.7	49.6	1.0	1.2
2	.7	.8	.7	.7	.7	.5	.6	3.7	5.1	9.0	1.0	1.2
3	.7	.8	.7	.7	.7	.5	.6	6.8	4.4	.7	1.0	1.2
4	.7	.8	.7	.7	.6	* 47.4	.6	1.4	3.8	.7	1.0	1.1
5	.7	.8	.7	.7	.6	*1,390	.6	1.3	3.1	.7	1.0	1.1
6	.7	.7	.7	.7	.6	.9	.6	26.5	2.5	1.0	.9	1.1
7	.7	.7	.8	.7	.6	.9	.6	9.0	1.8	.7	.9	1.1
8	.7	.7	.8	.7	.6	.9	.6	ᵘ 2.1	1.2	.7	.9	1.1
9	.7	.7	.8	.7	.6	.9	* 215	1,150	1.2	.8	.9	1.2
10	.7	.7	.8	.7	.6	.9	2.5	ᵘ 1.0	1.2	.8	.9	1.2
11	.7	.7	.8	.7	.6	.9	.7	ᵘ 1.0	1.2	.9	.9	1.3
12	.7	.7	.8	* 432	.6	7.5	.7	ᵘ 1.0	1.3	.9	.9	1.3
13	.7	.8	.8	* 54.2	.6	25.1	.7	79.5	1.3	1.0	1.0	1.4
14	.7	.8	.8	2.1	.6	70.2	.7	* 14.4	1.3	1.0	1.0	1.4
15	.7	.8	.8	.8	.6	5.8	.7	* .8	1.3	1.0	1.0	1.4
16	.8	.8	.8	2.1	.6	.3	.7	* .8	1.3	1.0	1.0	1.3
17	.8	.8	.8	.4	.5	.3	.6	* .8	1.3	1.0	1.0	1.3
18	.8	.8	.8	.4	.5	.3	.6	* 62.8	1.3	1.0	1.1	1.3
19	.8	.8	.8	.4	.5	.3	.6	* 111	1.3	1.0	1.1	1.3
20	.8	.8	.8	.8	.5	.3	.6	* 130	1.3	1.0	1.2	1.2
21	.8	.7	.8	.8	.5	.3	.6	* 254	14.1	1.1	1.2	1.2
22	.8	.7	.8	20.3	.5	.3	.6	* 186	.8	1.1	1.3	1.2
23	.8	.7	.8	5.1	.5	.3	3.1	* 268	.8	1.1	1.3	1.2
24	.8	.7	.7	4.2	.5	.4	.6	* 94.1	.8	1.1	1.3	1.2
25	.8	.7	.7	3.4	45.4	.4	.6	ᵘ 1.2	.8	1.2	1.3	1.2
26	.8	.7	.7	2.5	2.0	.4	.5	ᵘ 1.2	.8	1.2	1.3	1.2
27	.8	.7	.7	1.6	1.8	.5	.5	* 89.7	.9	1.2	1.2	1.1
28	.8	.7	.7	.7	1.6	20.3	.5	* 134	.9	1.1	1.2	1.1
29	.8		.7	.7	1.4	53.6	.5	11.5	.9	1.1	1.2	1.1
30	.8		.7	.7	1.2	97.4	.5	* 171	.9	1.1	1.2	1.1
31	.8		.7		1.0		.5	6.2		1.1		1.1
Sum	23.4	20.9	23.4	* 540.9	68.3	*1,728.5	* 238.3	*2,823.6	64.6	86.9	32.2	37.4

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1932-1954 Acre-Feet Average	Maximum	Minimum
Jan.	3.32	3.24	† 1	.8	† 2	.7	.8	46.4	181	* 273	46.4
Feb.	3.30	3.25	† 1	.8	† 6	.7	.7	41.5	166	234	41.5
Mar.	3.33	3.30	† 7	.8	† 1	.7	.8	46.4	185	270	46.4
Apr.	5.88	3.29	12	* 3,950	†17	.4	* 18.0	* 1,070	263	* 1,070	57.9
May	4.06	3.45	25	* 176	†17	.5	2.2	135	1,116	8,520	88.3
June	7.18	2.49	5	*15,200	†15	.3	* 57.6	* 3,430	* 1,866	* 6,360	50.8
July	4.64	2.89	9	* 2,050	†26	.5	* 7.7	* 473	* 3,220	* 18,500	122
Aug.	5.99	3.03	9	* 3,300	1	.5	* 91.1	* 5,600	* 3,091	* 16,330	73.0
Sept.	5.30		21	422	†22	.8	2.2	128	* 3,168	19,600	128
Oct.	5.66		1	880	† 3	.7	2.8	172	2,008	19,200	36.9
Nov.	4.50	4.47	†22	1.3	† 6	.9	1.1	63.9	212	807	35.7
Dec.	4.52	4.49	†13	1.4	† 4	1.1	1.2	74.2	194	408	39.3
Yearly	7.18			*15,200		.3	* 15.6	*11,280.4	* 15,670	40,444	* 3,109.2

ᵘ Estimated * Partly estimated † And other days Ø Mean daily

TERLINGUA CREEK NEAR TERLINGUA, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights. This creek enters the Rio Grande at the lower end of Santa Helena Canyon, 371.6 river miles below the American Dam at El Paso, Texas. From January 1 to June 11, when the stilling well washed out, the recording gage was located at a point 2.4 miles above the confluence with the Rio Grande. Zero of this gage was 2,195.99 feet above mean sea level, U.S.C. & G.S. datum. From June 11 through December 31, the recording gage was located 2.7 miles above the confluence and the zero of the gage was 2,203.52 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 50 meter measurements of low and medium flows, a high flow rating curve determined by slope-area calculations, and a continuous record of gage heights for medium and high flows for the period January through June 14. Computations by shifting channel methods. From June 14 through December, high and medium flows were estimated on the basis of observed high water marks and rainfall data; low flows were based on meter measurements and estimates by the hydrographer. Records available: January 1, 1932 through December 1954.

REMARKS: Irrigation diversions modify the flow of this spring-fed creek at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 34,900 second-feet on May 24, 1935, with a gage height of 17.59 feet. Min. no flow on September 29-30, 1937.

Average Flow in Second-Feet

Daily:	Max.	17,200	June 1, 1937	Min.	ᵘ 0	Sept. 29-30, 1937
Monthly:	Max.	921	June 1937	Min.	.83	Oct. 1934
Yearly:	Max.	146	1937	Min.	5.5	1943

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	* 1.5	* 1.5	1.5	* 1.5	* 1.7	* 1.6	ᵘ 16.0	ᵘ 3.0	ᵘ 8.0	ᵘ 2.5	2.2	ᵘ 1.9
2	* 1.5	* 1.5	* 1.5	* 1.5	* 1.6	* 1.6	16.0	3.0	ᵘ 93.0	ᵘ 2.5	ᵘ 2.1	ᵘ 1.9
3	1.5	* 1.5	* 1.5	* 1.5	* 1.5	* 1.6	ᵘ 14.0	ᵘ 3.0	ᵘ 10.7	ᵘ 2.5	ᵘ 2.1	1.9
4	* 1.5	* 1.5	* 1.5	* 1.5	* 1.5	* 1.6	ᵘ 12.0	ᵘ 3.0	ᵘ 6.0	2.5	ᵘ 2.0	ᵘ 1.9
5	* 1.5	* 1.5	* 1.5	* 1.5	* 1.5	*1,030	ᵘ 10.0	ᵘ 25.0	ᵘ 5.0	ᵘ 2.5	ᵘ 2.0	ᵘ 1.8
6	* 1.5	* 1.5	* 1.5	* 1.5	* 1.4	* 499	ᵘ 8.0	ᵘ 246	ᵘ 5.0	ᵘ 2.5	ᵘ 1.9	ᵘ 1.8
7	* 1.5	* 1.5	* 1.5	* 1.5	* 1.4	* 140	ᵘ 6.0	ᵘ 5.0	ᵘ 5.0	ᵘ 2.5	ᵘ 1.9	ᵘ 1.8
8	* 1.5	1.5	1.5	1.5	* 1.4	* 68.0	ᵘ 4.0	ᵘ 10.0	ᵘ 4.0	ᵘ 2.5	1.8	ᵘ 1.8
9	* 1.5	* 1.5	* 1.5	* 1.5	* 1.3	* 302	3.0	ᵘ 85.0	ᵘ 4.0	ᵘ 2.5	ᵘ 1.8	ᵘ 1.7
10	* 1.5	* 1.5	* 1.5	1.5	1.3	* 18.0	ᵘ 3.0	ᵘ 10.0	3.6	ᵘ 2.4	ᵘ 1.8	1.7
11	1.5	* 1.5	* 1.5	* 246	* 1.3	* 282	ᵘ 3.0	ᵘ 4.0	ᵘ 3.2	ᵘ 2.3	ᵘ 1.8	ᵘ 1.7
12	* 1.5	* 1.5	* 1.5	* 344	* 1.3	* 694	ᵘ 3.0	ᵘ 3.0	ᵘ 2.9	ᵘ 2.2	ᵘ 1.9	ᵘ 1.7
13	* 1.5	* 1.5	* 1.5	* 497	* 1.2	ᵘ 20.0	ᵘ 3.0	ᵘ 3.0	ᵘ 2.6	ᵘ 2.1	ᵘ 1.9	1.7
14	* 1.5	* 1.5	* 1.5	* 983	* 1.2	* 885	ᵘ 3.0	ᵘ 3.0	ᵘ 2.2	2.0	ᵘ 1.9	ᵘ 1.7
15	* 1.5	1.5	1.5	* 277	* 1.2	ᵘ 80.0	ᵘ 3.0	ᵘ 3.0	ᵘ 1.8	1.9	1.9	ᵘ 1.8
16	* 1.5	* 1.5	* 1.5	* 48.2	* 1.1	ᵘ 8.0	ᵘ 3.0	3.0	1.5	ᵘ 1.9	ᵘ 1.9	1.8
17	* 1.5	* 1.5	* 1.5	* 12.7	1.1	ᵘ 6.0	ᵘ 3.0	ᵘ 3.0	2.9	ᵘ 1.8	ᵘ 1.9	ᵘ 1.8
18	1.5	* 1.5	* 1.5	* 3.3	* 14.5	ᵘ 6.0	ᵘ 3.0	ᵘ 3.0	ᵘ 2.9	ᵘ 1.8	ᵘ 1.9	ᵘ 1.8
19	* 1.5	* 1.5	* 1.5	* 1.5	* 37.5	ᵘ 4.0	ᵘ 3.0	ᵘ 126	ᵘ 2.8	ᵘ 1.7	1.9	ᵘ 1.7
20	* 1.5	* 1.5	* 1.5	1.5	*1,080	ᵘ 4.0	ᵘ 3.0	ᵘ 5.0	2.8	ᵘ 1.7	ᵘ 1.9	1.7
21	* 1.5	* 1.5	* 1.5	1.5	* 378	ᵘ 4.0	ᵘ 3.0	ᵘ 5.0	ᵘ 2.8	1.6	ᵘ 1.9	ᵘ 1.8
22	* 1.5	* 1.5	* 1.5	* 244	* 321	ᵘ 4.0	ᵘ 10.0	ᵘ 60.0	ᵘ 2.7	ᵘ 1.7	ᵘ 1.9	ᵘ 1.8
23	* 1.5	* 1.5	* 1.5	* 52.7	* 34.5	ᵘ 4.0	ᵘ 92.0	ᵘ 183	ᵘ 2.6	ᵘ 1.8	ᵘ 1.9	ᵘ 1.8
24	* 1.5	* 1.5	* 1.5	* 464	3.0	* 194	ᵘ 12.0	ᵘ 80.0	2.6	ᵘ 1.9	ᵘ 1.9	1.9
25	1.5	1.5	1.5	* 33.8	* 296	ᵘ 6.0	ᵘ 4.0	ᵘ 12.0	ᵘ 2.6	ᵘ 1.9	ᵘ 1.9	ᵘ 1.9
26	* 1.5	* 1.5	* 1.5	* 2.5	* 158	ᵘ 4.0	3.0	ᵘ 5.0	ᵘ 2.5	ᵘ 2.0	1.9	ᵘ 1.9
27	* 1.5	* 1.5	* 1.5	* 2.0	* 18.5	ᵘ 5.0	ᵘ 3.0	ᵘ 5.0	2.5	ᵘ 2.1	ᵘ 1.9	ᵘ 1.9
28	* 1.5	* 1.5	* 1.5	* 2.0	* 1.6	ᵘ 6.0	ᵘ 3.0	ᵘ 69.0	ᵘ 2.5	2.2	ᵘ 1.9	ᵘ 1.9
29	* 1.5		* 1.5	* 2.0	* 1.6	ᵘ 75.0	ᵘ 3.0	ᵘ 119	ᵘ 2.5	ᵘ 2.2	1.9	ᵘ 1.9
30	* 1.5		* 1.5	* 1.9	* 1.6	ᵘ 18.0	ᵘ 3.0	ᵘ 62.0	ᵘ 2.5	ᵘ 2.2	ᵘ 1.9	ᵘ 1.9
31	* 1.5		* 1.5		* 1.6		ᵘ 3.0	ᵘ 12.0		ᵘ 2.2		1.9
Sum	* 46.5	* 42.0 * 46.5	* 3,235.6	*2,370.4	*4,372.4	ᵘ 261.0	ᵘ 1,161.0		ᵘ 195.7	ᵘ 66.1	ᵘ 57.5	ᵘ 56.2

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1932-1954 Acre-Feet Average	Maximum	Minimum
Jan.	1.79		† 1	Ø* 1.5	† 1	Ø* 1.5	* 1.5	* 92.2	* 190	743	82.7
Feb.	1.79		† 1	Ø* 1.5	† 1	Ø* 1.5	* 1.5	* 83.3	* 138	267	73.4
Mar.	1.79		† 1	Ø* 1.5	† 1	Ø* 1.5	* 1.5	* 92.2	* 270	* 2,410	72.4
Apr.	7.82	1.10	14	*7,260	† 1	Ø* 1.5	*108	* 6,420	* 1,339	15,500	55.1
May	5.75		20	*2,310	†16	Ø* 1.1	* 76.5	* 4,700	* 4,344	* 26,000	117
June			5	Ø* 1,030	† 1	Ø* 1.6	*146	* 8,670	* 6,816	54,800	59.5
July			23	Øᵘ 92.0	† 9	Øᵘ 3.0	ᵘ 8.4	ᵘ 518	* 7,673	* 28,700	ᵘ 518
Aug.			6	Øᵘ 246	† 1	Øᵘ 3.0	ᵘ 37.5	ᵘ 2,300	* 3,986	* 26,680	123
Sept.			2	Øᵘ 93.0	16	Ø* 1.5	ᵘ 6.5	ᵘ 388	* 6,130	24,600	123
Oct.			† 1	Øᵘ 2.5	21	Ø* 1.6	ᵘ 2.1	ᵘ 131	* 2,151	8,100	50.8
Nov.	.66		1	Ø* 2.2	† 8	Ø* 1.8	ᵘ 1.9	ᵘ 114	* 323	ᵘ 2,980	64.9
Dec.	.65		† 1	Øᵘ 1.9	† 9	Øᵘ 1.7	ᵘ 1.8	ᵘ 111	* 360	3,080	90.0
Yearly							* 32.6	*23,619.7	* 33,720	105,807	3,958.0

ᵘ Estimated * Partly estimated † And other days Ø Mean daily

RIO GRANDE AT JOHNSON RANCH, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located about 2 miles above Johnson Ranch, 14 miles below Castolon, Brewster County, Texas and Santa Elena Ranch, Chihuahua, and 392.9 river miles below the American Dam at El Paso, Texas. The zero of the gage is 2,045.30 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 156 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: April 1936 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 58,800 second-feet on September 23, 1938, with a gage height of 19.75 feet. Min. 0 several days in 1953.

Average Flow in Second-Feet

Daily:	Max.	56,900	Sept. 10,	1942	Min.	0	Several days 1953
Monthly:	Max.	23,600	Sept.	1942	Min.	0	May 1953
Yearly:	Max.	4,780		1942	Min.	167	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	184	191	95.8	9.6	20.6	10.4	71.9	14.2	3,000	488	240	216
2	178	183	82.2	7.1	13.1	6.3	1,250	13.1	2,620	421	295	222
3	178	179	84.6	7.0	11.6	4.3	850	1,190	2,380	1,080	292	237
4	182	175	90.4	6.3	10.2	4.3	* 452	1,960	2,200	818	292	224
5	189	175	90.8	6.2	9.4	725	446	1,270	2,410	783	302	217
6	179	173	91.2	5.8	7.1	2,300	* 299	3,280	2,130	927	289	207
7	163	162	134	5.8	4.9	809	* 144	1,430	1,580	1,580	262	203
8	146	157	140	3.9	3.7	462	65.9	* 616	* 1,190	1,450	273	192
9	152	150	136	3.9	2.3	260	232	991	* 1,090	1,580	267	178
10	151	144	150	3.9	2.0	100	340	1,670	935	1,330	254	175
11	155	141	149	274	1.3	258	1,100	976	* 738	1,390	233	175
12	152	154	130	1,220	.8	5,340	273	* 778	* 657	1,540	313	180
13	150	198	107	253	* .6	* 590	229	* 405	620	* 1,040	299	177
14	159	180	105	4,090	* .5	5,650	316	* 356	559	* 778	259	187
15	174	192	95.1	1,310	* .2	1,100	188	352	476	* 611	253	191
16	186	217	81.3	* 295	3.5	* 585	591	193	404	511	311	240
17	187	206	78.1	* 114	1.2	* 282	259	192	354	453	333	220
18	194	223	63.6	* 48.3	638	256	499	180	345	386	372	198
19	188	209	56.2	38.8	60.1	125	540	4,010	314	364	343	190
20	195	214	45.7	26.8	1,390	138	376	2,040	290	337	311	189
21	195	171	35.5	20.0	1,080	53.5	224	5,070	447	300	284	219
22	207	151	31.4	200	713	157	302	8,080	752	251	259	258
23	193	138	31.3	154	494	36.6	303	5,800	687	236	259	280
24	202	133	25.5	751	285	44.4	196	8,590	503	243	264	229
25	199	170	20.0	744	665	198	229	11,400	1,330	249	257	222
26	207	151	18.4	300	253	53.6	135	11,600	1,070	268	240	220
27	203	127	15.2	197	67.4	148	78.1	5,960	833	254	230	224
28	217	107	16.2	* 68.6	40.6	737	49.9	6,730	575	281	218	210
29	231		14.1	* 42.2	25.6	830	30.6	5,240	467	264	220	226
30	217		13.0	28.1	20.0	289	18.2	5,500	602	242	227	219
31	197		10.1		12.8		15.4	4,830		246		208
Sum	5,710	4,771	2,236.7	10,234.3	5,837.5	21,552.4	10,103.0	100,716.3	31,558	20,701	8,251	6,533

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period Apr. 1936-1954 Acre-Feet Average	Maximum	Minimum
Jan.	1.43	1.10	29	236	8	134	184	11,300	54,384	86,400	11,300
Feb.	1.48	1.03	19	235	28	91.1	170	9,460	50,626	80,900	9,460
Mar.	1.27	.47	11	163	31	8.6	72.2	4,440	42,512	85,300	4,440
Apr.	9.37	.42	14	14,400	† 8	3.9	341	20,300	22,272	79,300	457
May	4.35	.16	21	3,470	16	* .1	188	11,600	47,633	240,000	0
June	11.90	.43	14	19,300	† 2	4.3	718	42,700	63,025	251,000	3,270
July	4.11	.43	11	3,100	31	14.1	326	20,000	136,710	620,000	10,700
Aug.	9.97	.43	†21	13,100	2	11.7	3,250	200,000	130,784	485,000	12,300
Sept.	4.35	1.28	1	3,400	20	268	1,050	62,600	287,797	1,404,000	9,350
Oct.	3.78	1.18	3	2,870	30	228	668	41,100	166,570	929,000	4,940
Nov.	1.56	1.16	18	399	28	209	275	16,400	62,820	164,000	8,600
Dec.	1.36	1.08	22	299	10	167	211	13,000	53,653	110,000	9,510
Yearly	11.90	.16		19,300		* .1	626	452,900	1,118,786	3,461,400	120,747

* Partly estimated † And other days

RIO GRANDE AT AGUA VERDE STATION

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located near Agua Verde Dam site, 571.7 river miles below the American Dam at El Paso, Texas. The zero of the gage is 1,241.07 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 52 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: With some days missing, April to September and December 1947: January through June 1948; May 1949; January through May 1950; and continuous records from November 12, 1952 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: ‡ Momentary: Max. 14,600 second-feet on May 23, 1954, at a gage height of 15.98 feet. Min. 132 second-feet on April 29, 1953, at a gage height of .42 foot.

Average Flow in Second-Feet

Daily:	Max.	12,000	Aug. 27, 1954	Min.	145	June 15, 16, & 17, 1953
Monthly:	Max.	3,460	Aug. 1954	Min.	182	May 1953
Yearly:	Max.	919	1954	Min.	341	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	337	368	310	182	318	272	1,740	336	5,220	666	453	406
2	340	379	310	174	262	244	1,020	245	3,470	663	438	401
3	347	371	302	177	234	227	482	226	2,880	755	432	402
4	337	358	287	174	214	211	424	673	2,630	627	430	403
5	342	356	269	177	204	206	1,100	1,230	2,420	909	451	394
6	335	352	259	174	200	199	746	2,460	2,240	1,290	476	401
7	334	339	252	* 174	198	213	616	2,120	2,520	785	481	399
8	337	332	253	* 169	195	1,620	609	2,960	2,140	1,010	492	394
9	342	331	257	* 166	193	936	521	1,590	1,740	1,780	497	392
10	334	329	249	* 478	189	1,490	555	1,220	1,460	1,600	475	387
11	319	321	257	* 229	183	1,080	525	956	1,280	1,640	468	389
12	312	314	285	* 184	261	1,040	536	1,710	1,180	1,280	464	378
13	* 308	313	275	553	200	6,600	834	1,110	972	1,270	449	380
14	* 311	316	283	2,980	173	3,300	676	1,040	876	1,520	435	378
15	* 318	314	285	2,780	168	6,620	470	765	797	1,010	454	383
16	321	318	280	1,990	168	4,320	380	612	763	769	477	388
17	322	343	281	1,420	167	1,440	464	543	700	694	439	382
18	* 326	331	266	774	260	1,220	588	510	638	641	419	384
19	* 335	336	264	518	283	680	626	493	592	607	445	406
20	348	356	251	384	1,820	503	433	2,150	552	591	482	426
21	346	353	248	339	3,320	475	588	3,430	594	573	530	414
22	347	361	246	2,090	1,750	436	644	4,330	511	557	511	404
23	345	367	234	1,440	3,420	360	605	11,400	769	541	493	400
24	354	364	223	768	1,980	311	437	8,200	855	522	473	409
25	358	335	208	360	2,500	283	421	7,610	783	504	451	432
26	365	313	198	475	1,160	370	459	10,600	777	494	442	473
27	358	302	188	765	1,460	283	380	12,000	1,200	483	440	456
28	363	294	187	716	785	238	349	8,580	1,260	472	433	433
29	362		189	472	562	3,100	368	7,190	945	470	419	424
30	364		187	390	378	3,020	301	5,500	775	464	408	429
31	357		187		326		265	5,540		452		434
Sum	10,524	9,466	7,770	21,672	23,531	41,297	18,162	107,329	43,539	25,639	13,757	12,581

Current Year 1954 — Period Dec. 1952-1954

Month	Extreme Gage Feet High	Low	Day	Extreme Second-Feet High	Day	Low	Day	Average Second Feet	Total Acre-Feet	Acre-Feet Average	Maximum	Minimum
[illegible]	1.24	1.04	30	369	15	307		339	20,900	22,450	24,000	20,900
[illegible]	1.29	.98	2	362	27	287		338	18,800	19,350	19,900	18,800
[illegible]	1.12	.56	1	327	31	180		251	15,400	19,150	22,900	15,400
[illegible]	2.59	* .54	18	[illegible]	19	* 161		722	43,000	27,450	43,000	11,900
[illegible]	2.65	.51	27	[illegible]	16	163		759	46,700	28,950	46,700	11,200
[illegible]	11.86	.64	23	[illegible]	6	197		1,380	81,900	46,650	81,900	11,400
[illegible]	4.68	.77	1	2[illegible]	31	254		586	36,000	35,000	36,000	34,000
[illegible]	14.70	.86	27	[illegible]	4	221		3,460	213,000	118,850	213,000	24,700
[illegible]	7.95	1.61	1	5 [illegible]	22	492		1,450	86,400	59,400	86,400	32,400
[illegible]	4.61	1.29	6	2,2[illegible]	31	442		827	50,900	34,250	50,900	17,600
[illegible]	3.91	1.20	21	5[illegible]	30	402		459	27,300	22,400	27,300	17,500
[illegible]	1.38	1.07	25	4[illegible]	14	375		406	25,000	21,900	25,000	19,100
[illegible]	15.98	.51		14,600	*	161		919	665,300	455,806	665,300	246,600

* Partly estimated. ‡ Period November 12, 1952 through December 1954.

RIO GRANDE AT LANGTRY, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located at Langtry, Texas, 24.1 river miles above the confluence with the Pecos River and 614.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 1,091.69 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 83 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to October 1914; December 1919 to March 1920; January 1924 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. Backwater from the Pecos River peak flow during the 1954 flood, combined with a flow of 15,000 second-feet at this station, caused a gage height of 23.85 feet on June 28, 1954.

EXTREME FLOWS FROM RECORDS: The highest known gage height was 56.9 feet, which occurred about 3:00 P.M. on June 17, 1922. The discharge for this stage was 204,000 second-feet, which was estimated by extension of the rating curve. The lowest recorded flow was 208 second-feet, which occurred July 12, 1953.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	399	458	405	297	567	501	2,040	358	ᵘ 5,450	914	529	497
2	398	475	418	299	505	452	1,590	486	ᵘ 4,350	813	526	484
3	411	492	416	294	449	420	974	313	ᵘ 3,120	876	507	473
4	425	486	397	290	410	396	692	284	ᵘ 2,840	824	520	468
5	410	473	394	285	378	375	953	973	ᵘ 2,650	789	520	468
6	423	462	389	280	366	361	1,090	1,850	ᵘ 2,480	1,410	545	457
7	429	437	384	269	353	346	848	2,120	ᵘ 2,610	1,010	564	458
8	435	418	386	560	353	995	726	2,850	ᵘ 2,510	1,060	564	462
9	449	418	386	1,740	347	1,420	728	1,960	ᵘ 2,100	1,380	571	460
10	463	425	394	284	341	1,290	665	1,420	ᵘ 1,650	1,820	565	458
11	456	432	394	354	325	1,720	686	1,060	1,450	1,710	533	462
12	429	439	394	3,330	313	1,010	663	1,440	1,330	1,720	520	460
13	423	434	407	579	394	4,760	709	1,340	1,220	1,490	514	458
14	423	445	396	3,270	320	6,170	988	1,130	1,070	1,570	510	462
15	423	440	402	7,500	290	19,300	698	1,030	950	1,610	497	461
16	424	428	388	3,340	277	9,520	550	832	873	1,210	524	461
17	424	432	381	1,800	270	2,450	528	682	853	1,040	524	460
18	425	466	389	1,320	276	1,390	564	639	789	919	494	455
19	434	439	382	842	386	1,100	780	614	728	819	490	459
20	456	456	385	* 586	503	832	624	883	679	763	536	483
21	458	474	387	* 475	3,650	677	521	3,370	652	708	584	495
22	459	468	383	19,700	1,620	661	686	2,600	768	663	607	488
23	461	479	391	2,430	1,960	606	703	10,300	627	648	594	487
24	462	483	378	1,550	8,570	526	626	9,580	937	619	551	487
25	478	479	360	815	6,350	516	536	7,060	988	590	* 529	499
26	483	442	348	* 569	1,910	832	569	9,940	930	575	* 524	536
27	480	425	335	845	2,430	55,000	569	11,900	915	552	* 520	566
28	470	407	329	1,010	1,280	10,600	488	11,500	1,410	542	* 511	553
29	483		316	890	947	1,520	542	7,830	2,050	532	507	525
30	475		311	637	695	4,370	474	6,800	1,050	536	508	513
31	473		308		552		402	6,400		532		503
Sum	13,741	12,612	11,733	56,440	37,387	130,116	23,212	109,544	* 50,029	30,244	15,988	14,958

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1954 Acre-Feet Average	Maximum	Minimum
Jan.	.67	.48	25	486	1	392	443	27,300	86,128	* 245,000	27,300
Feb.	.76	.62	25	496	28	407	450	25,000	75,128	* 117,000	25,000
Mar.	.69	.41	2	433	31	301	378	23,300	71,975	118,000	23,300
Apr.	23.92	.38	22	57,200	8	259	1,880	112,000	59,613	112,000	17,800
May	11.74	.48	24	19,500	†17	270	1,210	74,200	90,773	271,000	16,200
June	49.87	.44	27	169,000	8	330	4,340	258,000	101,670	299,000	15,800
July	2.85	.54	1	2,360	31	379	749	46,000	152,262	719,000	31,700
Aug.	9.64	.41	28	13,400	5	264	3,530	217,000	186,800	* 730,000	31,100
Sept.	6.78	.84	29	8,320	23	587	* 1,670	* 99,200	324,099	1,410,000	19,600
Oct.	2.28	.70	10	1,930	31	526	976	60,000	223,917	1,063,000	23,200
Nov.	.84	.63	22	621	18	488	533	31,700	92,680	* 211,000	22,600
Dec.	.71	.57	27	572	7	452	483	29,700	81,999	135,000	24,800
Yearly	49.87	.38		169,000		259	1,390	1,003,400	1,547,044	3,851,500	326,100

ᵘ Estimated * Partly estimated † And other days

PECOS RIVER NEAR SHUMLA, TEXAS

DESCRIPTION: Bubbler water-stage recorder on rock ledge about 210 feet above river bed, located 13.0 river miles upstream from the Pecos High Bridge and 18.5 river miles above the confluence with the Rio Grande. This confluence is 638.2 river miles below the American Dam at El Paso, Texas. The zero of the gage is 1,159.52 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 12 wading measurements and a continuous record of gage heights since October 8, 1954. Computations by shifting channel methods. Records available: October 8 through December 1954 at this station. Records are also available for Pecos River near Comstock, 13.0 river miles downstream, from March 17 to December 3, 1898 and May 1900 through October 7, 1954. See page 23.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. The flood of June 1954 reached a gage height of 122.3 feet or an elevation of approximately 1,281.8 feet above mean sea level at this station.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1											211	* 201
2											209	206
3											204	206
4											204	206
5											201	206
6											202	204
7											205	199
8										237	208	* 196
9										229	208	* 199
10										368	211	198
11										519	214	198
12										445	217	200
13										377	213	193
14										342	210	194
15										302	209	* 195
16										286	203	* 186
17										268	202	195
18										254	201	192
19										245	203	200
20										237	203	201
21										234	204	208
22										226	201	212
23										222	203	208
24										221	205	204
25										222	205	* 203
26										224	205	* 197
27										228	205	* 194
28										225	206	* 194
29										225	201	* 193
30										219	* 192	* 192
31										217		* 193
Sum											6,165	*6,173

Month	Current Year 1954 — Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period — Acre-Feet Average	Maximum	Minimum
Jan.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug.											
Sept.											
Oct.											
Nov.	1.76	1.64	12	220	†29	192	206	12,200			
Dec.	1.72		21	220	16	Ø* 186	* 199	* 12,200			
Yearly											

* Partly estimated † And other days Ø Mean daily

PECOS RIVER NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car equipped for winch and heavy weights, located at the Pecos High Bridge on the railroad, 12 miles northwest of Comstock, Texas, and 5.5 miles above the confluence with the Rio Grande. This river enters the Rio Grande 638.2 river miles below the American Dam at El Paso, Texas. The zero of the gage is 1,058.01 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 22 meter measurements and a continuous record of gage heights from January through June 16, 1954. Computations by shifting channel methods. Recording gage installation and cableway were destroyed by flood on June 27, 1954. From June 17 through June 30, discharges were estimated on basis of a hydrograph constructed from observed gage heights, and a rating curve extended to the peak gage height and discharge of the flood of June 27-28, 1954. The peak discharge was determined by slope-area calculation. From July 1 through October 7, 1954, discharges were based on a flood-recession curve, proration between meter measurements, and after July 26, on 20 meter measurements and a continuous record of gage heights at a point 4.7 river miles downstream. Records available: March 17, 1898 to December 3, 1898 and May 1900 through October 7, 1954. Records are also available from October 8 through December 1954 for a station 13.0 river miles upstream. See page 22.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. **948,000 second-feet on June 28, 1954, with a gage height of 96.24 feet. Min. 71.3 second-feet on July 2, 1953, with a gage height of -.28 foot.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	151	150	136	121	278	347	u 3,640	420	u 301	254		
2	148	151	135	118	258	311	u 1,800	522	u 302	254		
3	147	148	137	120	244	755	u 1,280	479	u 303	247		
4	147	147	137	121	235	604	u 1,000	439	u 304	247		
5	146	147	139	124	221	385	u 890	474	u 305	264		
6	146	146	144	123	217	328	u 860	u 444	u 306	304		
7	146	143	149	123	210	306	u 840	u 413	307	298		
8	146	142	151	124	203	289	u 825	383	311			
9	146	142	154	131	197	274	u 802	u 398	273			
10	145	144	154	186	190	256	u 779	u 414	250			
11	145	139	152	163	194	244	u 756	u 430	251			
12	145	137	150	201	189	229	u 734	445	249			
13	145	137	145	2,430	182	223	u 711	u 417	251			
14	152	143	140	3,030	180	742	u 688	u 390	245			
15	158	145	143	8,160	177	27,100	u 665	u 362	244			
16	156	143	141	1,570	172	8,560	u 642	u 335	239			
17	155	140	141	614	170	u 1,800	u 619	307	237			
18	151	138	143	408	508	u 1,060	u 596	300	233			
19	149	138	145	339	550	u 619	u 574	293	226			
20	151	131	145	307	912	u 324	u 551	290	221			
21	147	129	144	276	451	u 239	* 528	u 291	228			
22	145	132	144	8,710	318	u 239	u 515	u 292	221			
23	150	136	144	6,450	269	u 239	u 502	u 293	214			
24	155	136	144	996	4,540	u 240	u 488	u 294	209			
25	158	138	140	485	6,900	u 240	u 475	u 295	214			
26	158	137	138	370	2,510	* 25,900	* 462	u 296	219			
27	155	139	133	340	963	*470,000	* 470	u 297	224			
28	151	133	132	329	638	*312,000	* 458	u 298	229			
29	148		132	312	508	* 25,200	* 450	u 298	* 231			
30	149		130	295	435	* 6,000	* 438	u 299	* 243			
31	151		130		376		* 430	u 300				
Sum	4,642	3,931	4,392	37,076	23,395	*885,053	u 24,468	* 11,208	* 7,590			

Month	Current Year 1954 — Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1924-1954 — Acre-Feet		
	High	Low	High Day	High	Low Day	Low			Average	Maximum	Minimum
Jan.	.31	.20	26	160	12	141	150	9,210	22,343	78,200	9,210
Feb.	.30	.17	3	152	21	126	140	7,800	18,040	62,300	7,800
Mar.	.22	.15	9	156	†30	130	142	8,710	17,233	40,700	8,710
Apr.	14.80	.09	22	26,100	2	116	1,240	73,500	18,645	73,500	7,440
May	9.32	.31	25	11,500	†17	170	755	46,400	32,308	156,000	6,280
June	96.24		28	**948,000	13	Ø 223	* 29,500	*1,756,000	* 86,861	* 1,756,000	4,810
July			1	u 4,750	31	Ø* 430	u 789	u 48,500	25,367	84,200	7,120
Aug.			2	Ø 522	20	Ø 290	* 362	* 22,200	18,984	50,400	5,740
Sept.			8	Ø 311	24	Ø 209	* 253	* 15,100	37,475	324,420	6,190
Oct.											
Nov.											
Dec.											
Yearly #							* 2,800	*2,028,520	371,212	* 2,028,520	100,920

u Estimated * Partly estimated † And other days Ø Mean daily ** Slope-area calculation # Yearly figures based on records at this station and at Pecos near Shumla, Texas.

GOODENOUGH SPRING NEAR COMSTOCK, TEXAS

DESCRIPTION: Water-stage recorder located 4,000 feet above the confluence with the Rio Grande and 11.75 miles southwest of Comstock, Val Verde County, Texas. The stream from this spring enters the Rio Grande 664.9 river miles below the American Dam at El Paso, Texas. The zero of the gage was lowered on October 22, 1954 from 968.42 to 967.42 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 23 meter measurements during the year and a continuous record of gage heights, after water-stage recorder was installed on October 12, 1954. Prior to that time, discharges were estimated between measurements. Computations by shifting channel methods. Records available: February 23, 1929 through December 1954.

REMARKS: The flow of this spring is very uniform and not modified by diversions or storage. Backwater reaches the station when a discharge of approximately 35,000 second-feet occurs in the Rio Grande at the confluence. A maximum gage height of 43.35 feet was reached by backwater on June 28, 1954.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 846 second-feet on September 18, 1941, with a gage height of 4.57 feet. Min. 71.2 second-feet on July 22, 1953.

Average Flow in Second-Feet

Daily:	Max.	ᵘ 455	Oct. 1, 1932	Min.	71.2	July 22, 1953
Monthly:	Max.	* 421	Oct. 1932	Min.	* 73.1	July 1953
Yearly:	Max.	266	1933	Min.	* 83.1	1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	ᵘ 84.1	ᵘ79.9	ᵘ 78.4	ᵘ 87.8	ᵘ 115	ᵘ 126	ᵘ 129	ᵘ 137	ᵘ 109	ᵘ 116	* 122	* 104
2	ᵘ 83.8	ᵘ 80.3	ᵘ 78.0	ᵘ 89.5	ᵘ 115	ᵘ 127	ᵘ 130	ᵘ 136	ᵘ 109	ᵘ 116	* 122	* 105
3	ᵘ 83.5	ᵘ 80.7	ᵘ 77.6	ᵘ 91.2	ᵘ 114	ᵘ 128	ᵘ 130	ᵘ 135	ᵘ 109	ᵘ 117	* 121	* 105
4	ᵘ 83.2	ᵘ 81.1	ᵘ 77.1	ᵘ 92.8	ᵘ 113	ᵘ 129	ᵘ 131	ᵘ 133	ᵘ 109	ᵘ 117	* 119	* 106
5	ᵘ 83.0	ᵘ 81.5	ᵘ 76.6	ᵘ 94.5	ᵘ 112	ᵘ 130	ᵘ 131	ᵘ 132	ᵘ 108	118	* 119	* 105
6	ᵘ 82.7	ᵘ 81.8	ᵘ 76.2	ᵘ 96.2	ᵘ 111	ᵘ 131	ᵘ 132	ᵘ 131	ᵘ 108	ᵘ 119	* 118	* 106
7	ᵘ 82.4	ᵘ 82.2	ᵘ 75.8	ᵘ 97.9	ᵘ 110	ᵘ 132	ᵘ 133	ᵘ 129	ᵘ 108	ᵘ 119	* 118	* 107
8	ᵘ 82.1	ᵘ 82.6	75.3	ᵘ 99.5	ᵘ 110	133	ᵘ 133	ᵘ 128	ᵘ 108	ᵘ 120	* 117	106
9	ᵘ 81.8	83.0	ᵘ 75.6	ᵘ 101	ᵘ 109	ᵘ 133	ᵘ 134	ᵘ 127	ᵘ 108	ᵘ 121	117	104
10	ᵘ 81.6	ᵘ 82.8	ᵘ 75.9	ᵘ 103	ᵘ 108	132	ᵘ 135	ᵘ 126	ᵘ 108	ᵘ 121	118	104
11	ᵘ 81.3	ᵘ 82.6	ᵘ 76.2	ᵘ 105	107	ᵘ 132	ᵘ 135	ᵘ 124	ᵘ 107	ᵘ 122	121	104
12	81.0	ᵘ 82.4	76.5	ᵘ 106	ᵘ 108	ᵘ 131	ᵘ 136	123	ᵘ 107	ᵘ 123	123	102
13	ᵘ 80.8	ᵘ 82.2	ᵘ 76.3	ᵘ 108	ᵘ 109	ᵘ 131	ᵘ 137	ᵘ 122	107	ᵘ 123	124	102
14	ᵘ 80.6	ᵘ 82.1	ᵘ 76.2	ᵘ 110	ᵘ 110	ᵘ 130	ᵘ 137	ᵘ 121	ᵘ 107	ᵘ 124	122	101
15	ᵘ 80.4	ᵘ 81.9	ᵘ 76.0	ᵘ 111	ᵘ 111	ᵘ 130	ᵘ 138	ᵘ 120	ᵘ 108	ᵘ 125	119	101
16	ᵘ 80.2	ᵘ 81.7	ᵘ 75.8	ᵘ 113	ᵘ 112	ᵘ 129	ᵘ 139	ᵘ 120	ᵘ 108	ᵘ 125	118	102
17	ᵘ 80.0	ᵘ 81.5	ᵘ 75.6	ᵘ 115	ᵘ 113	ᵘ 129	ᵘ 139	ᵘ 119	ᵘ 109	ᵘ 126	117	98.9
18	ᵘ 79.8	ᵘ 81.3	ᵘ 75.4	ᵘ 116	ᵘ 114	ᵘ 128	ᵘ 140	ᵘ 118	ᵘ 109	ᵘ 126	114	99.3
19	ᵘ 79.6	ᵘ 81.1	ᵘ 75.3	ᵘ 118	ᵘ 114	ᵘ 128	ᵘ 140	ᵘ 117	ᵘ 110	ᵘ 127	114	98.8
20	ᵘ 79.4	ᵘ 80.9	ᵘ 75.1	ᵘ 120	ᵘ 115	ᵘ 127	ᵘ 141	ᵘ 116	ᵘ 110	ᵘ 128	* 114	100
21	ᵘ 79.2	ᵘ 80.7	ᵘ 74.9	ᵘ 121	ᵘ 116	ᵘ 127	ᵘ 142	ᵘ 115	ᵘ 110	ᵘ 128	* 114	102
22	ᵘ 79.0	ᵘ 80.6	ᵘ 74.8	123	ᵘ 117	ᵘ 126	ᵘ 142	ᵘ 114	ᵘ 111	129	* 113	101
23	ᵘ 78.8	ᵘ 80.4	ᵘ 74.6	ᵘ 122	ᵘ 118	ᵘ 126	ᵘ 143	ᵘ 113	ᵘ 111	128	* 111	102
24	ᵘ 78.6	ᵘ 80.2	74.4	ᵘ 121	ᵘ 119	ᵘ 125	ᵘ 144	ᵘ 113	ᵘ 112	128	* 110	102
25	ᵘ 78.4	ᵘ 80.0	ᵘ 76.1	ᵘ 120	ᵘ 120	125	ᵘ 144	ᵘ 112	ᵘ 112	128	* 109	103
26	ᵘ 78.2	79.8	ᵘ 77.8	ᵘ 120	ᵘ 121	ᵘ 126	145	ᵘ 111	ᵘ 113	128	* 108	103
27	78.0	ᵘ79.4	ᵘ 79.4	ᵘ 119	ᵘ 122	ᵘ 126	ᵘ 144	110	113	124	108	104
28	ᵘ 78.4	ᵘ78.9	ᵘ 81.1	ᵘ 118	ᵘ 123	ᵘ 127	ᵘ 142	ᵘ 110	ᵘ 114	126	107	101
29	ᵘ 78.8		ᵘ 82.8	ᵘ 117	ᵘ 124	ᵘ 128	ᵘ 141	ᵘ 110	ᵘ 114	124	104	102
30	ᵘ 79.2		ᵘ 84.5	ᵘ 116	ᵘ 125	ᵘ 128	ᵘ 140	ᵘ 109	ᵘ 115	* 123	* 104	103
31	ᵘ 79.5		ᵘ 86.1		ᵘ 126		ᵘ 139	ᵘ 109		* 123		103
Sum	*2,497.4	*2,273.6 *2,391.4	*3,272.4	*3,561	* 3,860	* 4,266		* 3,740	* 3,291	* 3,822	*3,465	3,187.0

Month	Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	High	Extreme Second-Feet Low Day	Low	Average Second-Feet	Total Acre-Feet	Period Mar. 1929-1954 Acre-Feet Average	Maximum	Minimum
Jan.			1	ᵘ 84.1	27	Ø 78.0	* 80.6	* 4,950	7,966	19,620	* 4,520
Feb.			9	Ø 83.0	28	Øᵘ 78.9	* 81.2	* 4,510	7,099	17,030	* 4,320
Mar.			31	ᵘ 86.1	24	Ø 74.4	* 77.1	* 4,740	7,749	17,770	* 4,740
Apr.			22	Ø 123	1	Øᵘ 87.8	* 109	* 6,490	7,506	16,580	* 4,980
May			31	ᵘ 126	11	Ø 107	* 115	* 7,060	8,104	16,840	* 4,870
June			† 8	Ø 133	†24	Ø 125	* 129	* 7,660	8,140	16,040	* 4,470
July			26	Ø 145	1	Øᵘ 129	* 138	* 8,460	8,672	16,460	* 4,500
Aug.			1	ᵘ 137	†30	Øᵘ 109	* 121	* 7,420	8,339	15,840	5,450
Sept.			30	ᵘ 115	†11	Øᵘ 107	* 110	* 6,530	8,895 ᵘ	25,000 *	5,120
Oct.			22	Ø 129	† 1	Øᵘ 116	* 123	* 7,580	9,195 *	25,870 *	5,150
Nov.	1.28		13	125	†29	Øᵘ 104	* 116	* 6,870	8,450	21,850 *	4,750
Dec.		.92	7	Øᵘ 107	19	98.8	103	6,320	8,288	20,470 *	4,780
Yearly				Ø 145		Ø 74.4	* 109	* 78,590	98,403	192,840 *	60,320

ᵘ Estimated * Partly estimated † And other days Ø Mean daily

UPPER DEVILS RIVER STATION

DESCRIPTION: Bubbler water-stage recorder on rock ledge about 50 feet above river bed, located 26.4 river miles upstream from U.S. 90 highway bridge and 30.9 river miles above the confluence with the Rio Grande. This confluence is 680.1 river miles below the American Dam at El Paso, Texas. The sea level elevation of the zero of the gage is undetermined.

RECORDS: Based on 11 meter measurements by wading, a continuous record of gage heights, and a stable rating curve. Records available: August 7 through December 1954 at this station; August through December for Devils River near Mouth, 30.1 miles downstream; September 2, 1932 through December 1954 for Devils River near Del Rio, 26.4 miles downstream; December 1923 to September 1, 1932 for a point 28.2 miles downstream; and May 1900 to March 1914 for a point 29.2 miles downstream. See pages 26 and 27.

REMARKS: This station is located above slack water from the proposed Diablo Reservoir on the Rio Grande. The June 1954 flood reached a gage height of 35.9 feet at this station.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									257	226	209	191
2									257	223	209	191
3									254	223	212	188
4									254	223	212	191
5									251	284	212	188
6									254	293	212	191
7								302	254	* 237	212	191
8								299	251	* 231	212	191
9								296	251	* 231	212	186
10								287	251	* 231	206	183
11								284	251	* 231	204	181
12								280	248	* 231	204	186
13								277	248	* 234	206	186
14								274	245	229	204	186
15								274	243	226	206	183
16								274	243	226	209	183
17								271	243	226	209	183
18								271	231	223	209	181
19								271	231	223	206	181
20								268	234	226	206	181
21								265	243	229	204	178
22								265	234	229	201	178
23								265	234	229	199	178
24								262	234	231	199	178
25								262	231	231	196	178
26								259	231	229	199	178
27								254	231	223	196	176
28								262	229	220	196	173
29								299	220	217	196	171
30								268	226	215	193	171
31								262		215		171
Sum									7,264	7,145	6,150	5,652

Current Year 1954 | Period

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug.											
Sept.	2.59	2.42	1	262	29	215	242	14,400			
Oct.	2.85	2.40	5	344	31	209	230	14,200			
Nov.	2.43	2.33	4	217	30	191	205	12,200			
Dec.	2.33	2.24	† 1	191	28	169	182	11,200			
Yearly											

* Partly estimated † And other days

DEVILS RIVER NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder on the main highway bridge, 12 miles northwest of Del Rio, Texas, and 4.5 miles above the confluence with the Rio Grande. Devils River enters the Rio Grande 680.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 951.80 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 19 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Flood peak discharge of June 28, 1954 by slope-area computation. Records available: September 2, 1932 through December 1954. Records are also available from May 1900 to March 1914 for a point 2.8 miles below the highway bridge and from December 1923 to September 1, 1932 for a point 1.8 miles below the highway bridge.

REMARKS: The monthly flow of this spring-fed river is not modified, but the daily flow is modified by two power dams with a combined hydroelectric generating capacity of 3,100 kva, the operation of which began in 1929.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow was 597,000 second-feet, which occurred September 1, 1932, at a corrected gage height of 36.60 feet at the present station. This gage height was determined by check-levels run during the 1954 flood survey. Zero flow sometimes occurs for a few hours at this station.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	182	173	140	112	527	365	u 655	518	385	445	358	376
2	193	167	175	118	438	372	u 655	519	368	325	360	333
3	193	167	148	139	369	327	u 655	513	348	327	341	291
4	193	166	139	154	334	316	u 655	488	370	336	364	307
5	203	166	138	145	315	314	u 655	473	397	432	269	336
6	186	166	136	144	310	306	u 655	486	328	552	387	284
7	192	166	140	143	321	294	u 655	470	372	488	353	306
8	192	166	175	142	317	310	u 655	474	385	417	353	323
9	186	165	142	188	311	290	* 655	448	377	418	353	299
10	209	165	137	194	295	298	644	451	381	420	367	292
11	181	155	148	130	231	290	634	426	374	422	375	286
12	171	155	153	218	295	290	624	411	389	377	342	345
13	171	154	167	180	287	285	624	432	387	359	331	298
14	172	159	119	329	260	285	603	416	378	408	371	275
15	172	141	110	971	251	10,800	594	366	385	337	337	298
16	178	103	119	2,180	255	1,270	594	414	371	307	336	304
17	183	125	140	957	247	1,050	595	394	356	340	327	332
18	179	154	150	662	263	331	586	359	353	359	350	309
19	179	195	147	406	291	238	577	370	357	381	316	311
20	180	127	138	274	277	224	566	397	350	317	348	314
21	185	124	146	300	303	152	557	400	352	337	347	313
22	171	142	150	295	311	136	548	383	359	411	322	324
23	176	148	143	2,970	279	174	530	355	367	387	328	328
24	177	160	151	2,490	253	178	530	405	352	375	395	328
25	172	158	137	798	231	185	522	336	342	379	293	336
26	167	148	119	678	1,080	6,600	523	420	331	383	296	337
27	157	172	118	403	684	45,000	515	388	313	395	320	334
28	174	136	128	328	569	* 227,000	533	368	324	350	339	381
29	174		148	366	463	* 42,600	553	368	311	390	335	199
30	174		132	7,860	362	* 1,480	526	401	341	339	278	346
31	173		126		328		499	407		363		351
Sum	5,595	4,323	4,359	24,274	11,057	* 341,760	* 18,372	13,056	10,803	11,876	10,191	9,796

Month	Current Year 1954							Period 1924-1954		
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet		
	High	Low	Day	High	Day	Low			Average	Maximum	Minimum
Jan.	1.72	1.27	10	350	22	101	180	11,100	21,361	45,250	9,150
Feb.	1.84	1.27	19	456	16	98.9	154	8,570	20,191	54,500	8,570
Mar.	1.75	1.31	24	336	19	79.3	141	8,650	20,653	43,300	8,650
Apr.	7.75	1.25	30	30,300	21	77.2	809	48,100	23,875	67,800	8,030
May	2.58	1.24	26	1,610	14	151	357	21,900	38,911	356,900	10,100
June	34.76	1.07	28	** 585,000	26	111	* 11,400	* 678,000	* 66,528	* 678,000	8,080
July	u 1.42	1.17	9	u 667	31	437	* 593	* 36,400	46,909	377,000	8,460
Aug.	1.60	.78	21	846	23	109	421	25,900	25,200	107,000	8,050
Sept.	1.52	.64	4	729	27	34.0	360	21,400	69,587	895,990	8,660
Oct.	1.43	.50	6	590	20	33.7	383	23,600	43,282	349,000	9,780
Nov.	1.44	.49	28	627	5	55.3	340	20,200	23,651	60,300	9,820
Dec.	1.52	.46	29	765	29	58.9	316	19,400	22,087	49,520	9,330
Yearly	34.76	.46		** 585,000		33.7	* 1,280	* 923,220	422,235	1,284,080	131,830

u Estimated * Partly estimated ** Slope-area calculation

DEVILS RIVER NEAR MOUTH

DESCRIPTION: Water-stage recorder and rock and concrete low-flow control, located 3.7 river miles downstream from U.S. 90 highway bridge and .8 mile above the confluence with the Rio Grande. This confluence is 680.1 river miles below the American Dam at El Paso, Texas. The zero of the gage is 911.00 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 12 meter measurements by wading, a continuous record of gage heights, and a stable rating curve. Records available: August through December 1954 at this station; August 7 through December 1954 for Upper Devils River station, 30.1 miles upstream; September 2, 1923 through December 1954 for Devils River near Del Rio, 3.7 miles upstream; December 1923 to September 1, 1932 for a point 1.9 miles upstream; and May 1900 to March 1914 for a point .9 mile upstream. See pages 25 and 26.

REMARKS: The monthly flow of this spring-fed stream is not modified, but the daily flow is modified by two power dams with a combined hydroelectric generating capacity of 3,100 kva, the operation of which began in 1929. During the flood of June 1954, the water surface reached an elevation of 969.00 feet at the steam electric plant, located approximately 2,000 feet upstream from this station.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	u Dec.
1								552	484	577	434	476
2								552	463	473	441	432
3								548	477	450	422	388
4								532	438	453	437	403
5								524	504	565	349	431
6								528	433	695	456	377
7								528	439	631	439	398
8								528	471	548	438	414
9								508	459	536	438	388
10								516	462	540	457	380
11								504	453	532	453	373
12								496	465	483	433	430
13								512	466	469	424	382
14								504	460	516	469	358
15								473	468	465	435	379
16								516	459	408	438	384
17								516	443	450	438	411
18								492	440	461	450	386
19								464	443	492	412	387
20								509	440	398	438	389
21								521	449	431	442	386
22								498	454	496	414	396
23								446	465	473	417	399
24								527	457	453	492	397
25								433	473	461	395	404
26								528	446	461	359	404
27								512	430	477	396	399
28								504	450	434	422	445
29								469	436	469	423	262
30								508	467	419	386	407
31								506		446		411
Sum								15,754	13,694	15,162	12,847	u12,276

Current Year 1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug.	3.10	1.58	21	843	23	242	508	31,200			
Sept.	2.89	1.30	4	748	24	158	456	27,200			
Oct.	2.93	1.08	6	766	20	100	489	30,100			
Nov.	2.78	1.07	28	699	5	97.8	428	25,500			
Dec.	2.94	.92	29	u 777	29	u 59.8	u 396	u 24,300			
Yearly											

u Estimated

RIO GRANDE BELOW DIABLO DAM SITE

DESCRIPTION: Bubbler water-stage recorder on rock ledge about 98 feet above river bed and stand-up type cable car equipped for winch and heavy weights, located 10.6 river miles above the international highway bridge between Del Rio, Texas and Cd. Acuña, Coahuila, 2.9 river miles below the confluence of the Devils River, and 683.0 river miles below the American Dam at El Paso, Texas. The zero of the gage is 893.79 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 15 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: September 1 through December 31, 1954. Records are also available from May 1900 to April 1915 for a station 1.9 miles upstream; from December 1919 to March 1920 for a station 1.6 miles downstream near McKee's Switch; from December 1923 to July 2, 1941 for a station approximately 10.4 miles downstream; and from July 2, 1941 through August 1954 (see page 30) for the station at the international highway bridge, 10.6 miles downstream.

REMARKS: Reservoirs, diversions, and drainage and power plant returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: The flood of June 1954 reached a peak gage height of 55.72 feet and a maximum discharge of 1,158,000 second-feet, determined by slope-area computation. This is the greatest rate of discharge recorded at any point on the Rio Grande.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									6,720	2,590	1,460	1,400
2									6,390	2,210	1,460	1,340
3									5,020	2,070	1,430	1,330
4									4,270	1,970	1,430	1,340
5									3,990	2,320	1,380	1,370
6									3,680	4,430	1,440	1,300
7									3,490	3,150	1,470	1,280
8									3,700	2,190	1,490	1,280
9									* 3,440	2,120	1,490	1,260
10									3,000	2,510	1,520	1,260
11									2,590	2,920	1,520	1,240
12									2,420	3,050	1,470	1,280
13									2,300	2,790	1,440	1,260
14									2,230	2,650	1,490	1,270
15									2,180	2,810	1,440	1,300
16									2,090	2,490	1,430	1,320
17									2,030	2,210	1,440	1,340
18									1,880	2,050	1,440	*1,340
19									1,810	1,980	1,380	*1,330
20									1,720	1,810	1,380	*1,360
21									1,860	1,770	1,430	1,330
22									1,700	1,770	1,460	1,400
23									1,750	1,720	1,490	1,390
24									1,520	1,620	1,560	1,390
25									1,850	1,590	1,460	1,390
26									1,910	1,560	1,380	*1,390
27									1,850	1,590	1,380	*1,400
28									1,800	1,490	1,410	1,500
29									2,190	1,530	1,410	1,230
30									3,080	1,470	1,310	1,430
31										1,490		1,460
Sum									84,460	67,920	43,290	41,510

Month	Current Year 1954						Period		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet
			High		Low				
	High	Low	Day		Day				Average / Maximum / Minimum
Jan.									
Feb.									
Mar.									
Apr.									
May									
June									
July									
Aug.									
Sept.	4.65	1.78	1	7,590	24	1,100	2,820	168,000	
Oct.	4.90	1.97	6	8,360	30	1,360	2,190	135,000	
Nov.	2.18	1.78	28	1,670	30	1,100	1,440	85,900	
Dec.	2.20	1.67	30	1,800	29	1,070	1,340	82,300	
Yearly									

* Partly estimated

ARROYO LAS VACAS NEAR CD. ACUNA, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car, located 1.5 miles upstream from Cd. Acuña, Coahuila and 1.8 miles upstream from the confluence of Arroyo las Vacas with the Rio Grande at a point just above the Del Rio-Cd. Acuña International Bridge. This confluence is 693.5 river miles below the American Dam at El Paso, Texas. The zero of the gage is 884.15 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 155 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: Occasional estimates from June 1935 to March 19, 1938; continuous record from March 20, 1938 through December 1954.

REMARKS: The low flow of this stream is from springs. Backwater from the Rio Grande reaches this station when the stage at Del Rio Station reaches about 21.0 feet, or a flow of about 110,000 second-feet. On June 28, 1954, backwater from the Rio Grande reached a gage height of 18.34 feet at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 25,780 second-feet on September 30, 1954, with a gage height of 16.14 feet. Min. .3 second-foot on various days in 1952, 1953, and 1954.

Average Flow in Second-Feet

Daily:	Max. 3,530	Oct. 3, 1944	Min. .3		Several days 1952, 1953 & 1954
Monthly:	Max. 207	June 1954	Min. .4		Several months 1952, 1953 & 1954
Yearly:	Max. 44.1	1954	Min. 2.8		1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.7	.3	1.0	1.1	139	2.1	27.6	2.8	2.1	961	4.6	4.3
2	.7	.3	.4	1.1	8.8	1.1	20.1	2.5	2.1	22.6	5.0	4.6
3	.7	.3	1.0	1.1	3.5	1.1	9.9	2.8	2.1	10.2	5.3	4.6
4	.7	.4	.7	1.1	3.2	1.1	9.9	2.5	2.1	10.2	5.3	4.6
5	.3	.4	.7	.7	3.2	2.5	7.1	2.5	2.1	381	5.3	4.2
6	.3	.4	1.0	.7	3.2	2.5	8.5	2.5	2.1	2,180	5.3	4.2
7	.3	.4	1.0	.7	2.5	2.5	6.4	2.5	2.1	70.6	5.3	4.2
8	.7	.4	1.0	.7	2.5	2.1	7.1	2.5	2.1	35.7	5.3	4.2
9	.3	.7	1.0	.7	2.5	2.1	6.4	2.5	1.4	26.1	5.3	4.2
10	.3	.7	1.0	1.1	2.5	1.8	6.4	2.5	1.4	23.3	5.0	4.2
11	.3	.7	1.0	1.1	2.1	1.8	5.0	2.5	1.4	19.4	5.0	4.2
12	.3	.4	1.0	.7	1.4	1.8	4.9	2.5	2.1	17.3	5.0	4.2
13	.4	.4	1.0	.7	2.1	1.8	4.6	2.5	2.1	17.7	4.6	4.2
14	.4	.7	1.0	597	1.8	1.8	4.6	2.5	2.1	14.8	4.6	4.2
15	.4	.7	1.1	312	1.8	957	4.2	2.2	2.1	9.9	4.2	4.2
16	.4	.7	1.1	12.4	2.1	21.2	4.2	2.2	1.7	8.8	3.9	4.2
17	.4	.7	.7	3.2	1.8	7.8	3.5	2.1	1.7	7.8	3.5	4.2
18	.7	1.1	1.1	2.1	86.9	5.3	2.5	2.1	1.7	8.1	3.5	3.9
19	.4	.7	1.1	2.1	7.1	3.2	2.5	2.1	1.7	7.4	3.5	3.9
20	.4	.7	1.1	2.1	2.1	3.5	2.5	2.1	1.7	7.8	3.9	3.6
21	.4	.7	1.1	2.1	1.8	3.5	3.9	2.1	1.7	7.4	3.9	3.6
22	.7	.4	1.1	2.1	1.8	3.5	3.9	2.1	2.0	7.1	4.2	3.9
23	.7	.7	1.1	2.1	1.8	2.1	2.8	2.1	1.7	6.0	4.2	4.3
24	.7	.7	1.1	1.8	915	3.5	2.8	2.1	1.7	7.4	4.2	4.3
25	.7	.7	.7	1.8	80.9	3.5	2.8	2.1	1.7	6.4	4.2	4.3
26	.7	.7	1.1	1.8	9.9	1,570	2.8	2.1	2.1	6.0	4.6	4.6
27	.7	.7	1.1	1.8	7.4	3,450	2.8	2.1	2.1	7.1	4.6	4.6
28	.7	1.1	1.1	1.8	5.7	49.4	2.8	2.1	1.7	5.7	4.2	4.6
29	.7		1.1	1.8	3.2	42.4	2.8	2.1	1.7	5.7	4.2	4.2
30	.4		1.1	530	4.6	42.4	2.5	2.1	2,590	5.7	4.2	4.2
31	.4		1.1		3.9		2.5	2.1		4.9		4.2
Sum	15.9	16.8	30.7	1,489.5	1,316.1	6,194.4	180.3	71.5	2,644.3	3,909.1	135.9	130.9

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1938-1954 Acre-Feet Average	Maximum	Minimum
Jan.	1.46	1.44	† 1	.7	† 5	.3	.5	31.5	355	910	31.5
Feb.	1.48	1.44	†18	1.1	† 1	.3	.6	33.3	665	5,950	33.3
Mar.	1.48	1.44	† 1	1.1	2	.4	1.0	60.9	748	2,600	59.3
Apr.	6.10	1.25	14	3,360	† 5	.7	49.7	2,950	1,051	4,580	75.4
May	6.20	1.18	24	3,570	12	1.4	42.5	2,610	1,453	5,090	90.0
June	12.47	1.48	27	15,080	† 2	1.1	206	12,290	1,435	12,290	43.8
July	1.90	1.54	1	60.0	†18	2.5	5.8	358	1,422	8,230	26.8
Aug.	1.57	1.48	† 1	2.8	31	1.4	2.3	142	828	3,850	42.2
Sept.	16.14	1.48	30	25,780	† 9	1.4	88.1	5,240	1,600	6,850	37.3
Oct.	11.61	.98	6	13,000	31	4.9	126	7,750	1,303	9,390	22.6
Nov.	1.05	.85	† 3	5.3	†17	3.5	4.5	270	329	u 1,670	21.0
Dec.	1.21	.85	† 2	4.6	†20	3.5	4.2	260	289	704	22.0
Yearly	16.14	.85		25,780		.3	44.2	31,995.7	11,478	31,995.7	2,066.7

u Estimated † And other days

RIO GRANDE NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder located on the downstream side of a pier of the international highway bridge between Del Rio, Texas and Cd. Acuña, Coahuila, and 693.6 river miles below the American Dam at El Paso, Texas. Measurements from highway bridge. The zero of the gage is 864.30 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 29 meter measurements during the year, 24 by the United States and 5 by the Mexican Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: July 2, 1941 through August 1954. Records are also available from May 1900 to April 1915 for a station 12.5 miles upstream; from December 1919 to March 1920 for a station 9 miles upstream near McKee's Switch; from December 1923 to July 2, 1941 for a station 900 feet above the international highway bridge; and from September through December 1954, at a new station, Rio Grande Below Diablo Dam Site, 10.6 miles upstream. See page 28.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow of 1,140,000 second-feet occurred June 28, 1954, with a gage height of 38.25 feet. This peak flow was deduced by subtracting 18,000 second-feet from the peak discharge which occurred below Diablo Dam site, 10.6 miles upstream. This subtraction was for estimated flattening of the flood wave in traveling between these points. The lowest recorded flow was 519 second-feet, which occurred July 1, 1953, with a gage height of .28 foot.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	940	949	810	670	2,470	1,570	18,800	2,070				
2	936	950	813	663	* 1,750	1,480	11,500	1,870				
3	940	964	833	665	* 1,460	1,390	8,480	1,970				
4	936	961	819	688	1,300	1,580	6,620	1,880				
5	922	966	822	689	1,170	1,450	5,360	1,730				
6	918	962	809	675	1,130	1,280	4,910	1,920				
7	904	950	796	682	1,100	1,210	4,780	2,640				
8	909	946	799	661	1,070	1,150	4,230	3,160				
9	908	935	827	812	1,050	1,470	3,850	3,700				
10	907	924	799	1,890	999	1,910	3,640	2,980				
11	923	897	804	970	984	1,780	3,390	2,710				
12	895	886	792	2,810	1,000	2,180	3,090	2,540				
13	885	884	788	4,580	948	1,550	2,950	2,510				
14	883	882	818	3,980	968	6,360	2,840	2,530				
15	882	881	758	21,400	961	56,700	2,930	2,300				
16	880	844	762	11,200	926	51,700	2,760	2,170				
17	887	833	775	4,280	919	13,900	2,580	2,020				
18	894	844	821	2,570	1,710	6,210	2,400	1,890				
19	893	881	844	1,780	1,630	4,480	2,360	1,790				
20	891	892	832	1,420	1,270	3,140	2,410	1,800				
21	890	833	822	1,250	1,560	2,460	2,400	1,800				
22	897	868	835	1,350	4,140	2,080	2,220	3,730				
23	895	870	839	33,700	2,170	1,900	2,200	4,220				
24	930	881	835	7,300	8,060	1,810	2,220	12,000				
25	938	901	806	3,170	17,800	1,660	2,140	9,410				
26	954	911	770	2,060	11,200	5,310	2,020	8,530				
27	955	871	743	1,630	4,780	282,000	1,980	11,200				
28	955	848	716	1,560	4,140	763,000	1,980	12,400				
29	956		720	1,660	2,690	237,000	1,980	9,800				
30	957		755	21,900	2,050	38,500	1,930	8,540				
31	949		713		1,790		1,970	7,020				
Sum	28,409	25,214	24,675	138,665	85,195	1,498,210	122,920	134,830				

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	.92	.79	† 1	958	23	850	916	56,300	150,003	344,000	56,300
Feb.	.88	.65	26	983	28	798	900	50,000	134,345	261,000	50,000
Mar.	.78	.40	19	922	31	669	796	48,900	130,573	224,670	48,900
Apr.	14.83	.38	30	51,800	7	645	4,620	275,000	125,608	275,000	43,500
May	8.06	.98	25	19,300	17	855	2,750	169,000	186,988	* 742,000	40,100
June	38.25	1.08	28	1,140,000	8	1,030	49,900	2,972,000	293,782	2,972,000	37,200
July	13.43	8.06	1	26,500	30	1,900	3,970	244,000	247,839	*1,228,000	64,400
Aug.	11.20	7.84	24	12,900	21	1,660	4,350	267,000	250,386	865,000	68,700
Sept.											
Oct.											
Nov.											
Dec.											
Yearly											

* Partly estimated † And other days

SAN FELIPE CREEK NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder at Silos farm road bridge 1.75 miles south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande. This confluence is 1.6 river miles below the Del Rio gaging station on the Rio Grande. This stream enters the Rio Grande 695.2 river miles below the American Dam at El Paso, Texas. The zero of the gage is 875.05 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 18 meter measurements during the year and a continuous record of gage heights, except for the period June 27 to August 25, 1954, when the recorder was removed because of backwater from the Rio Grande. Computations by shifting channel methods. Rating curves based on low and medium-flow measurements by wading or from bridge and high-flow measurements by slope-area computations. Records available: September 1, 1931 through December 1954.

REMARKS: Municipal diversions at Del Rio and irrigation diversions greatly modify the flow of this spring-fed creek at this station. Backwater from the Rio Grande reaches this station when the Rio Grande near Del Rio reaches a stage of 15 feet or a flow of about 60,000 second-feet. The highest gage height of record was 26.89 feet on June 28, 1954 caused by combined creek flow and backwater from the Rio Grande.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 45,000 second-feet on June 14, 1935, with a gage height of 23.20 feet. Min. .4 second-foot on July 20, 1953.

Average Flow in Second-Feet

Daily:	Max.	ᵘ 16,200	June 14, 1935	Min.	1.5	July 21, 1953
Monthly:	Max.	* 805	June 1935	Min.	4.6	July 1953
Yearly:	Max.	* 136	1935	Min.	25.1	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	ᵘ July	ᵘ Aug.	* Sept.	Oct.	Nov.	Dec.
1	31.2	13.7	18.3	7.8	41.1	31.1	102	61.4	61.3	* 580	76.1	76.9
2	31.2	14.7	16.4	7.7	39.4	27.4	100	61.4	61.3	104	74.6	75.7
3	30.6	15.3	15.4	7.7	41.0	28.1	98.9	61.4	61.3	98.9	74.2	75.6
4	30.6	15.2	15.4	9.2	41.8	28.1	97.6	61.4	60.8	93.1	73.8	75.5
5	30.6	15.1	15.4	9.2	41.8	30.3	96.3	61.4	60.3	282	74.5	75.5
6	30.6	14.5	* 14.9	7.9	41.7	31.1	94.9	61.4	59.8	108	76.3	74.3
7	29.8	13.8	* 15.4	7.1	41.7	26.6	93.6	61.4	59.2	94.1	79.2	70.9
8	31.3	14.3	* 15.0	13.1	39.9	25.9	92.2	61.4	58.7	97.6	79.9	72.0
9	31.3	16.9	* 13.0	15.8	39.8	22.4	90.9	61.4	58.2	95.3	79.5	70.8
10	30.7	16.1	* 13.5	15.2	39.8	19.6	89.6	61.4	57.7	94.1	81.3	74.0
11	29.9	15.4	* 13.0	12.6	38.9	20.3	88.2	61.4	57.2	92.9	82.0	76.1
12	29.9	14.1	* 13.0	10.6	37.2	20.3	86.9	61.4	56.7	91.8	81.6	76.1
13	34.4	14.6	* 12.0	9.6	35.6	21.0	85.5	61.4	56.1	87.2	84.5	74.9
14	37.4	14.5	* 11.5	216	34.7	22.4	84.2	61.4	55.6	80.5	87.5	75.3
15	36.5	14.4	* 11.5	87.6	29.4	1,070	82.9	61.4	55.1	79.4	84.8	*72.4
16	35.8	12.7	* 11.5	42.7	25.8	80.3	81.5	61.4	54.6	77.2	84.4	*72.8
17	35.7	13.1	* 11.0	37.8	24.4	54.9	80.2	61.4	55.1	75.7	84.0	*73.2
18	36.4	13.7	* 9.4	19.9	62.0	50.5	78.8	61.4	55.6	75.3	83.6	*73.7
19	36.3	14.8	9.3	17.9	26.8	45.5	77.5	61.4	56.2	73.8	82.1	*74.1
20	36.3	15.9	8.6	16.5	26.2	45.5	76.2	61.4	56.7	73.3	80.6	*74.5
21	33.2	14.8	8.0	16.5	24.8	41.3	74.8	61.4	57.2	69.7	80.2	*74.9
22	31.0	15.9	9.0	19.7	23.5	39.7	73.5	61.4	57.7	68.2	78.7	*75.3
23	30.2	14.8	10.5	25.3	25.0	38.9	72.1	61.4	58.3	67.8	78.3	*75.7
24	30.2	15.8	8.8	35.0	71.6	38.1	70.8	61.4	58.8	69.5	76.8	*76.1
25	25.1	* 16.4	6.4	36.6	50.5	37.3	69.4	61.4	59.3	68.1	75.3	*76.6
26	21.6	* 15.9	7.5	34.9	31.2	60.4	68.1	61.4	59.8	67.6	76.0	*77.0
27	20.9	* 17.3	6.8	30.3	31.3	ᵘ 260	66.8	61.3	60.4	70.4	75.6	*79.6
28	20.2	19.7	6.1	28.0	32.9	ᵘ 107	65.4	61.3	60.9	82.2	76.3	*84.4
29	20.8		7.2	24.3	33.0	ᵘ 104	64.1	61.3	61.4	80.7	75.9	*87.1
30	19.5		7.1	345	34.7	ᵘ 103	62.7	61.3	602	74.7	75.8	87.8
31	13.8		6.4		34.0		61.4	61.3		75.4		88.5
Sum	923.0	423.4	*347.3	1,167.5	1,141.5	2,531.0	ᵘ2,527.0	ᵘ1,902.9	*2,293.3	3,248.5	2,373.4	*2,367.3

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period Sept. 1931-1954 Acre-Feet Average	Maximum	Minimum
Jan.	.70	.22	13	44.6	31	10.4	29.8	1,830	3,645	7,070	934
Feb.	.43	* .20	28	21.9	17	10.3	15.1	840	2,865	8,630	487
Mar.	.39	.04	1	21.9	27	3.1	* 11.2	* 689	2,446	5,030	* 689
Apr.	6.58	.18	30	1,650	3	2.4	38.9	2,320	2,753	* 8,120	566
May	4.53	.40	24	750	22	17.9	36.8	2,260	3,980	* 14,800	739
June	** 26.89	.38	15	5,790	† 9	10.3	84.4	5,020	* 5,533	* 47,900	301
July			1	Øᵘ 102	31	Øᵘ 61.4	ᵘ 81.5	ᵘ 5,010	* 3,281	* 8,800	285
Aug.			† 1	Øᵘ 61.4	†27	Øᵘ 61.3	ᵘ 61.4	ᵘ 3,770	2,906	6,060	806
Sept.	11.97		30	* 5,900	16	Ø* 54.6	* 76.4	* 4,550	4,289	19,100	872
Oct.	11.20	.81	1	* 5,260	23	64.5	105	6,440	3,807	8,470	1,000
Nov.	1.00	.85	14	91.9	27	70.2	79.1	4,710	3,020	5,570	526
Dec.	1.00		31	90.7	9	Ø 70.8	* 76.4	* 4,700	3,031	5,870	496
Yearly				* 5,900		3.1	* 58.2	* 42,139	41,553	* 98,137	18,201

ᵘ Estimated * Partly estimated † And other days Ø Mean daily ** Caused by combined creek flow and backwater from the Rio Grande.

PINTO CREEK NEAR DEL RIO, TEXAS

DESCRIPTION: Water-stage recorder and concrete control dam, .6 mile below the Del Rio-Eagle Pass highway and 5.5 miles above the confluence with the Rio Grande. This creek enters the Rio Grande 717.7 river miles below the American Dam at El Paso, Texas. The zero of the gage is 854.61 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 9 meter measurements during the year by wading and a continuous record of gage heights. The station has a stable rating curve defined by low-flow measurements by wading, medium-flow measurements made from the cable prior to its destruction in 1948, and high-flow measurements by slope-area computations. Records available: November 22, 1928 through December 1954.

REMARKS: Small irrigation diversions modify the flow of this spring-fed creek at this station. Backwater from the Rio Grande flood of June 1954 reached an elevation of 842.50 feet on Pinto Creek near its mouth.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 186,000 second-feet on June 24, 1948, with a gage height of 32.0 feet. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max.	* 28,200	June 24, 1948	Min.	0	Frequently
Monthly:	Max.	* 953	June 1948	Min.	0	Frequently
Yearly:	Max.	105	1932	Min.	1.8	1945

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	1.8	.5	17.4	u 9.8	2.0	15.9	5.3	6.0
2	0	0	0	0	1.2	0	12.8	u 3.1	2.0	3.1	5.8	6.6
3	0	0	0	0	.7	0	10.2	u 2.3	2.0	1.6	5.6	6.6
4	0	0	0	0	.3	0	7.0	u 1.9	2.0	1.6	5.6	7.1
5	0	0	0	0	0	0	5.7	u 1.7	1.9	60.0	5.5	6.4
6	0	0	0	0	0	0	4.4	u 1.6	1.9	13.6	5.7	5.2
7	0	0	0	0	0	0	3.8	u 1.3	2.0	14.9	6.1	* 5.2
8	0	0	0	0	0	0	3.1	u 1.0	2.0	13.2	6.8	* 5.4
9	0	0	0	0	0	0	2.5	u .6	2.0	8.8	7.2	* 5.5
10	0	0	0	0	0	0	2.0	u .4	2.0	6.7	8.6	* 5.8
11	0	0	0	0	0	0	1.9	u .4	2.0	5.8	8.4	* 6.5
12	0	0	0	0	0	0	1.8	u .3	2.0	5.5	8.1	* 6.8
13	0	0	0	0	0	0	1.6	u .2	2.0	5.4	8.8	* 6.3
14	0	0	0	0	0	0	1.6	u .2	2.0	5.2	8.2	* 5.9
15	0	0	0	0	0	5,490	5.0	u .2	2.1	4.5	7.5	* 5.6
16	0	0	0	0	0	233	9.4	u .1	2.1	4.2	7.9	5.9
17	0	0	0	0	0	29.4	2.3	u .1	2.0	4.1	8.4	5.6
18	0	0	0	0	0	16.0	1.6	.1	1.9	4.1	6.9	5.5
19	0	0	0	0	0	10.2	1.6	.1	2.0	4.6	6.0	5.5
20	0	0	0	0	0	5.7	1.6	0	2.1	4.8	5.6	5.5
21	0	0	0	0	0	3.4	1.6	0	2.1	5.1	5.5	5.5
22	0	0	0	0	0	2.3	1.6	0	2.1	5.1	5.4	5.6
23	0	0	0	0	0	1.9	1.6	0	2.1	4.4	5.4	5.8
24	0	0	0	0	449	1.6	1.5	.2	2.1	4.4	5.8	5.8
25	0	0	0	0	54.0	1.6	1.5	.6	2.2	4.9	5.5	5.8
26	0	0	0	0	14.9	3.2	.5	1.3	2.3	5.2	5.5	6.1
27	0	0	0	0	4.6	14.8	.5	1.9	2.3	5.4	6.6	6.6
28	0	0	0	0	1.6	346	u 1.7	1.9	2.2	5.1	6.5	5.9
29	0		0	0	1.4	168	u 1.7	1.9	2.2	4.8	5.2	4.8
30	0		0	26.6	1.1	30.9	u 1.6	2.0	63.1	4.6	5.2	5.7
31	0		0		.7		u 30.7	2.0		4.9		6.2
Sum	0	0	0	26.6	531.3	6,358.5	* 141.8	u 37.2	122.7	241.5	194.6	*182.7

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.				0		0	0	0	352	2,110	0
Feb.				0		0	0	0	548	5,760	0
Mar.				0		0	0	0	439	2,500	0
Apr.	4.42		30	238	† 1	0	.9	52.8	629	3,600	0
May	6.65		24	1,920	† 4	0	17.1	1,050	2,019	20,500	0
June	14.32		15	18,500	† 2	0	212	12,600	* 4,422	* 56,700	0
July	4.01		u 31	104	†25	.5	* 4.6	* 281	2,365	30,000	0
Aug.	u 3.68		1	u 26.0	†20	0	u 1.2	u 73.8	2,203	48,700	0
Sept.	4.95		30	508	† 5	1.9	4.1	243	1,602	17,300	0
Oct.	5.09	3.23	5	602	3	1.5	7.8	479	722	4,000	0
Nov.	3.48	3.37	10	9.0	1	5.0	6.5	386	310	2,150	0
Dec.	3.44	3.35	4	7.1	†28	4.8	* 5.9	* 362	380	2,180	0
Yearly	14.32			18,500		0	21.4	15,527.6	* 15,991	76,259.3	1,325.2

Current Year 1954 — Period Dec. 1928-1954

u Estimated * Partly estimated † And other days

RIO SAN DIEGO AT JIMENEZ, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and masonry and concrete Cipoletti weir control for measuring flows up to 706 second-feet, located 4.4 miles west of Jiménez, Coahuila, and 5.0 miles above the confluence with the Rio Grande. This stream enters the Rio Grande 722.4 river miles below the American Dam at El Paso, Texas. The zero of the gage is 828.90 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 3 meter measurements made at high flow during the year, the weir discharge table, and a continuous record of gage heights. The discharge during the year did not exceed the capacity of the weir except on April 15, May 24, June 15, 27, and 28, and October 6. Records available: 1922 through December 1954. The records from 1922 to September 1932 are considered doubtful.

REMARKS: Reservoirs and irrigation diversions modify the flow of this spring-fed stream at this station.

EXTREME FLOWS FROM RECORDS: ‡ Momentary: Max. about 75,200 second-feet on September 18, 1941, with a gage height of 20.96 feet. Min. no flow occurred on several occasions during April, May, and June 1939, May and August 1952, and July and August 1953.

Average Flow in Second-Feet

Daily:	Max.	* 23,200	Sept. 18, 1941	Min.	0	Occasionally
Monthly:	Max.	2,380	Oct. 1932	Min.	9.1	June 1953
Yearly:	Max.	527	1935	Min.	37.9	1939

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	63.2	63.2	42.0	32.8	143	284	434	114	74.9	304	114	74.9
2	63.2	63.2	42.0	32.8	100	284	367	114	74.9	114	114	74.9
3	63.2	63.2	42.0	52.3	87.2	265	347	129	63.2	87.2	114	74.9
4	63.2	63.2	42.0	42.0	87.2	245	325	143	42.0	114	101	74.9
5	63.2	63.2	42.0	42.0	74.9	245	304	143	42.0	227	100	74.9
6	63.2	63.2	42.0	32.8	74.9	245	284	114	63.2	795	100	74.9
7	63.2	63.2	42.0	32.8	74.9	245	265	114	74.9	367	114	74.9
8	52.3	52.3	42.0	24.0	63.2	209	245	114	114	265	100	74.9
9	52.3	42.0	42.0	32.8	63.2	192	245	114	144	265	87.2	74.9
10	52.3	42.0	42.0	32.8	63.2	175	227	114	143	265	87.2	74.9
11	52.3	42.0	42.0	32.8	52.3	175	209	100	143	245	87.2	63.2
12	52.3	42.0	32.8	32.8	52.3	175	192	100	143	245	87.2	63.2
13	52.3	32.8	32.8	32.8	42.0	175	175	87.3	114	245	87.2	63.2
14	52.3	32.8	32.8	63.2	42.0	175	175	87.2	87.2	227	87.2	63.2
15	42.0	32.8	32.8	639	42.0	1,080	159	87.2	63.2	227	87.2	63.2
16	52.3	32.8	42.0	192	42.0	367	143	87.2	52.3	209	100	63.2
17	42.0	32.8	42.0	100	52.3	175	159	87.2	52.3	209	87.2	63.2
18	42.0	32.8	42.0	74.9	42.0	175	175	87.2	42.0	209	87.2	63.2
19	52.3	32.8	42.0	63.2	42.0	175	159	87.2	42.0	192	87.2	63.2
20	63.2	32.8	42.0	52.3	42.0	143	175	87.2	42.0	192	87.2	63.2
21	63.2	42.0	42.0	63.2	42.0	143	143	74.9	42.0	192	87.2	63.2
22	63.2	42.0	42.0	63.2	42.0	129	143	63.2	42.0	192	87.2	63.2
23	63.2	42.0	42.0	63.2	42.0	114	143	63.2	52.3	175	74.9	63.2
24	63.2	42.0	42.0	63.2	1,220	114	129	63.2	52.3	175	74.9	63.2
25	63.2	42.0	42.0	63.2	533	87.2	114	63.2	52.3	175	74.9	63.2
26	52.3	42.0	42.0	63.2	434	100	114	63.2	52.3	159	74.9	63.2
27	52.3	42.0	42.0	63.2	558	2,310	87.2	63.2	52.3	143	74.9	63.2
28	52.3	42.0	42.0	63.2	459	1,010	114	63.2	63.2	143	74.9	63.2
29	52.3		42.0	42.0	367	586	100	74.9	52.3	129	74.9	63.2
30	52.3		32.8	325	325	484	114	63.2	98.2	114	74.9	63.2
31	100		24.0		325		100	74.9		114		63.2
Sum	1,779.8	1,261.1	1,238.0	2,512.7	5,629.6	10,281.2	6,065.2	2,841.0	2,176.3	6,714.2	2,689.8	2,076.2

Month	Current Year 1954							Period Oct. 1932-1954		
	Extreme Gage Feet		Extreme Second-Feet			Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low			Average	Maximum	Minimum
	High	Low	Day		Day					
Jan.	3.48	2.82	31	367	†15	42.0	57.4	3,530	6,958	36,430	2,610
Feb.	2.89	2.76	† 1	63.2	19	24.0	45.0	2,500	5,556	25,760	1,970
Mar.	2.82	2.76	† 1	42.0	31	24.0	39.9	2,460	5,347	27,040	2,100
Apr.	4.36	2.76	15	1,030	8	24.0	83.8	4,980	5,454	21,650	1,110
May	5.77	2.79	24	2,850	†13	42.0	182	11,170	* 13,607	* 120,200	861
June	7.02	2.95	27	4,770	25	87.2	343	20,390	10,501	62,240	543
July	3.61	2.95	1	459	27	87.2	196	12,030	9,217	34,430	836
Aug.	3.12	2.89	† 3	159	†22	63.2	91.6	5,640	7,944	32,180	1,250
Sept.	3.67	2.82	30	509	† 4	42.0	72.5	4,320	* 14,644	* 84,620	1,480
Oct.	5.05	2.92	6	1,710	3	74.9	217	13,320	18,391	146,640	1,720
Nov.	3.02	2.92	† 1	114	†14	74.9	89.7	5,340	11,355	68,290	1,430
Dec.	2.92	2.89	† 1	74.9	†11	63.2	67.0	4,120	7,624	45,160	2,050
Yearly	7.02	2.76		4,770		24.0	124	89,800	116,598	* 381,720	27,460

* Partly estimated † And other days ‡ Period October 1932-1954

RIO GRANDE NEAR JIMENEZ, COAHUILA

DESCRIPTION: Temporary water-stage recorder located 5.0 miles below Jiménez, Coahuila, 26.7 miles above Eagle Pass, Texas and Piedras Negras, Coahuila, and 728.0 miles below the American Dam at El Paso, Texas. The zero of the gage is 755.86 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 30 meter measurements, by wading during low flow, and a continuous record of gage heights during periods of low and medium flows. Computations by shifting channel methods. Records available: May 9 through 23; October, November, and December 1952; January 1 through March 8, March 17 through July 21, July 28 through August 20, 1953; and October 14, 1953 through April 9, 1954.

REMARKS: This station was installed in 1952 for temporary use in connection with a loss and gain study made on the Rio Grande between this station and San Antonio Crossing station. Operation was resumed in October 1952 and continued during periods of low and medium flows through March 1954. This station was destroyed by the high water of April 1954.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	61.4	95.7	37.4	23.3								
2	60.7	89.0	42.7	25.4								
3	60.4	71.7	30.7	33.9								
4	77.7	88.3	34.3	42.4								
5	77.3	87.6	30.7	37.1								
6	75.6	85.8	34.6	37.1								
7	73.8	84.0	35.3	33.9								
8	86.5	75.2	35.7	28.3								
9	88.3	65.0	32.1	28.3								
10	90.1	53.3	36.7									
11	75.9	42.4	33.2									
12	75.9	33.5	33.9									
13	91.1	29.3	33.2									
14	91.1	29.3	27.2									
15	90.8	29.3	26.8									
16	93.9	29.0	35.0									
17	80.5	18.4	38.5									
18	83.0	18.4	38.8									
19	78.4	33.5	39.6									
20	73.8	24.7	31.8									
21	69.2	28.6	29.3									
22	56.9	32.5	24.0									
23	78.4	32.1	28.6									
24	82.6	28.3	25.4									
25	67.5	29.0	23.3									
26	65.0	29.3	19.4									
27	62.9	34.3	22.2									
28	94.6	39.9	23.7									
29	91.1		22.9									
30	90.8		23.3									
31	118		28.2									
Sum	2,463.2	1,337.4	958.5									

Current Year 1954 — Period # 1952-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	1.74	1.25	31	178	1	37.8	79.5	4,890	3,950	4,890	3,010
Feb.	1.48	.98	1	110	†17	18.4	47.8	2,650	2,975	3,300	2,650
Mar.	1.28	.92	2	63.9	26	15.5	30.9	1,900			
Apr.											
May											
June											
July											
Aug.											
Sept.											
Oct.									2,040	2,690	1,390
Nov.									3,060	3,610	2,510
Dec.											
Yearly											

† And other days # Some months missing

RIO SAN RODRIGO NEAR EL MORAL, COAHUILA

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and reinforced concrete control weir for measuring flows up to 177 second-feet. This station is located 10.6 miles west of the town of El Moral, Coahuila, 19.3 miles northwest from Piedras Negras, Coahuila and 11.2 river miles above the confluence with the Rio Grande. The stream enters the Rio Grande 735.4 river miles below the American Dam at El Paso, Texas. The zero of the gage is 879.95 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 11 meter measurements made during previous years, the weir discharge table, and a continuous record of gage heights. The discharge did not exceed the capacity of the weir, except on April 25, May 23 to 31, June 1, 15, 27, 28, 29, 30, July 1, and September 21. Records available: 1922 through December 1954. The records from 1922 to 1931 are considered doubtful.

REMARKS: The flow of this spring-fed stream is modified by irrigation diversions above this station.

EXTREME FLOWS FROM RECORDS: ‡ Momentary: Max. * 81,200 second-feet on September 7, 1932, with a gage height of 16.08 feet on the original gage (see Water Bulletin No. 16). Min. frequently no flow, which occurs at a gage height of 0.0 foot.

Average Flow in Second-Feet

Daily:	Max.	* 27,900	Sept. 7, 1932	Min.	0	Frequently
Monthly:	Max.	4,270	Sept. 1932	Min.	0	Several months in 1939, 1952 & 1953
Yearly:	Max.	571	1932	Min.	7.4	1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	37.4	37.4	21.2	12.0	21.2	184	184	113	43.8	31.4	64.3	50.1
2	37.4	31.4	21.2	8.1	21.2	152	162	96.1	43.8	31.4	64.3	43.8
3	37.4	31.4	16.3	8.1	21.2	132	152	96.1	43.8	31.4	64.3	43.8
4	37.4	31.4	16.3	8.1	21.2	113	142	87.6	43.8	31.4	64.3	43.8
5	37.4	31.4	21.2	8.1	21.2	96.1	142	87.6	43.8	31.4	64.3	43.8
6	37.4	31.4	16.3	8.1	21.2	87.6	123	87.6	43.8	43.8	64.3	37.4
7	37.4	26.1	16.3	8.1	21.2	79.5	123	79.5	43.8	64.3	64.3	37.4
8	37.4	26.1	16.2	8.1	21.2	71.7	123	79.5	43.8	57.2	64.3	37.4
9	37.4	26.1	16.2	16.2	21.2	64.3	123	71.7	43.8	57.2	64.3	43.8
10	31.4	26.1	16.2	16.2	21.2	64.3	123	71.7	43.8	50.1	64.3	43.8
11	31.4	21.2	16.2	12.0	21.2	64.3	123	71.7	43.8	43.8	71.7	37.4
12	37.4	26.1	16.2	12.0	16.3	64.3	123	71.7	37.4	43.8	64.3	43.8
13	37.4	26.1	12.0	12.0	21.2	57.2	123	64.3	37.4	43.8	57.2	43.8
14	43.8	26.1	12.0	57.2	16.2	57.2	123	57.2	31.4	43.8	57.2	43.8
15	43.8	26.1	12.0	26.1	16.2	344	123	57.2	31.4	43.8	57.2	43.8
16	37.4	21.2	12.0	21.2	16.2	113	123	57.2	31.4	43.8	57.2	43.8
17	37.4	21.2	16.2	16.3	16.2	79.5	123	57.2	31.4	43.8	57.2	37.4
18	37.4	21.2	16.2	16.3	21.2	71.7	113	57.2	31.4	43.8	57.2	37.4
19	37.4	21.2	16.2	12.0	21.2	71.7	104	64.3	31.4	43.8	57.2	37.4
20	31.4	21.2	12.0	12.0	21.2	64.3	104	57.2	31.4	50.1	57.2	37.4
21	31.4	21.2	16.2	12.0	21.2	57.2	104	57.2	103	50.1	57.2	31.4
22	31.4	21.2	16.2	12.0	21.2	57.2	104	57.2	43.8	50.1	57.2	37.4
23	31.4	21.2	16.2	12.0	954	57.2	104	57.2	37.4	57.2	57.2	37.4
24	31.4	21.2	12.0	12.0	660	57.2	104	57.2	31.4	57.2	57.2	37.4
25	31.4	21.2	12.0	26.1	264	50.2	96.1	57.2	31.4	57.2	57.2	37.4
26	31.4	21.2	12.0	21.2	341	71.7	87.6	57.2	31.4	57.2	57.2	37.4
27	31.4	21.2	12.0	21.2	752	2,250	87.6	50.1	31.4	57.2	57.2	31.4
28	43.8	21.2	12.0	21.2	406	551	87.6	50.1	31.4	57.2	57.2	31.4
29	37.4		12.0	21.2	307	294	87.6	50.1	31.4	64.3	57.2	31.4
30	37.4		12.0	21.2	254	217	87.6	50.1	31.4	64.3	50.1	31.4
31	37.4		8.1		216		87.6	43.8		64.3		31.4
Sum	1,118.6	700.0	459.1	478.3	4,595.5	5,694.4	3,616.7	2,073.0	1,180.4	1,510.2	1,801.5	1,206.5

Month	Current Year 1954								Period 1932-1954		
	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	.33	.26	†14	43.8	†10	31.4	36.1	2,220	3,216	14,850	171
Feb.	.30	.16	1	37.4	19	16.2	25.0	1,390	2,608	11,580	373
Mar.	.20	.10	† 1	21.2	31	8.1	14.8	911	2,352	9,900	491
Apr.	.85	.10	25	184	† 2	8.1	15.9	949	2,675	21,160	281
May	4.17	.16	23	2,290	† 6	16.2	148	9,120	5,585	42,330	0
June	6.50	.36	27	4,660	†24	50.1	190	11,300	6,168	41,660	0
July	.89	.52	1	195	†26	87.6	117	7,170	3,756	12,170	0
Aug.	.79	.33	1	162	31	43.8	66.9	4,110	4,469	23,580	0
Sept.	2.33	.26	21	904	†14	31.4	39.3	2,340	* 19,089	* 253,960	0
Oct.	.46	.23	† 7	71.7	3	26.1	48.7	3,000	9,227	81,360	0
Nov.	.46	.36	11	71.7	30	50.1	60.0	3,570	4,739	24,450	0
Dec.	.36	.26	1	50.1	†21	31.4	38.9	2,390	3,880	19,060	131
Yearly	6.50	.10		4,660		8.1	66.9	48,470	* 67,764	* 414,310	5,353

* Partly estimated † And other days ‡ Period 1932-1954

RETURN FLOW TO THE RIO GRANDE AT MAVERICK POWER PLANT NEAR EAGLE PASS, TEXAS

DESCRIPTION: A part of the water diverted from the river into the Maverick Canal is returned to the Rio Grande through the hydroelectric power plant near Eagle Pass, Texas, at a point about 32.2 canal miles below the point of diversion, and about 744.9 river miles below the American Dam at El Paso, Texas.

RECORDS: Based on records furnished by the Maverick County Water Control and Improvement District No. 1, showing hourly manometer readings of discharge, in cubic feet per second, through each turbine at the Central Power and Light Company hydroelectric power plant. The mean daily discharges computed from the manometer readings have been multiplied by a factor to make them agree with periodic current meter measurements of flow made under stable flow conditions by hydrographers of this Commission. Records available: January 1949 through December 1954.

REMARKS: This power plant began operating April 16, 1932, with hydroelectric power generating facilities for 12,000 kilowatts. Because the September 1932 flood washed out the upper end of the Maverick Canal, this plant did not operate from September 2, 1932 until March 17, 1937. Since then, however, it has operated continuously, except from June 30 to July 20, during the flood of 1954, and while the canal was being repaired.

The Rio Grande floods of 1932, 1948, and 1954 reached, at the power plant, elevations of 752.2, 751.2, and 756.5 feet, respectively, above mean sea level, U.S.C. & G.S. datum.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	576	780	448	139	981	1,090	0	387	710	810	313	797
2	579	786	405	136	1,010	1,040	0	363	745	780	0	805
3	598	726	382	109	987	1,030	0	454	755	849	0	848
4	600	671	386	106	971	982	0	516	749	878	317	896
5	592	672	381	106	956	1,000	0	509	753	990	807	901
6	580	716	405	106	911	1,020	0	530	751	922	921	910
7	595	701	372	128	876	901	0	538	761	842	982	877
8	592	673	406	154	800	725	0	537	783	988	972	894
9	582	671	365	326	799	614	0	536	828	926	968	906
10	619	651	399	562	708	691	0	560	878	975	963	813
11	616	570	371	743	617	734	0	582	846	1,000	972	777
12	645	528	352	635	522	754	0	617	864	1,060	907	793
13	609	503	351	587	511	780	0	655	875	1,040	967	789
14	630	507	359	979	453	789	0	648	854	1,040	1,010	777
15	613	518	340	1,080	447	1,120	0	675	941	1,060	1,000	751
16	636	518	271	1,090	446	1,200	0	678	951	1,060	1,030	738
17	634	474	259	1,050	428	1,090	0	681	952	1,040	957	727
18	634	412	280	1,030	477	1,090	0	670	957	1,020	946	733
19	636	452	347	1,020	873	1,080	0	755	955	971	937	746
20	599	475	330	1,030	922	1,080	77.1	814	940	961	877	727
21	558	511	314	1,040	921	1,040	49.0	761	929	962	900	736
22	514	488	280	968	907	1,010	70.8	712	931	947	906	760
23	531	482	297	921	819	972	84.6	663	942	966	872	786
24	550	531	242	805	1,140	815	84.6	730	980	962	897	791
25	556	498	238	926	1,100	771	159	581	965	951	878	789
26	610	489	211	941	1,080	973	169	604	968	961	856	789
27	632	508	152	933	1,080	1,180	198	761	960	961	826	789
28	694	456	149	949	1,080	725	147	681	917	970	831	801
29	779		133	963	1,080	423	117	649	917	968	824	793
30	777		150	973	1,090	0	154	654	955	968	681	673
31	781		151		1,100		141	708		945		729
Sum	19,147	15,967	9,526	20,535	26,092	26,719	1,451.1	19,209	26,312	29,773	24,317	24,641

Current Year 1954 — Period 1949-1954

Month	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.			31	781	22	514	618	38,000	48,933	64,700	34,400
Feb.			2	786	18	412	570	31,700	42,850	57,200	24,900
Mar.			1	448	29	133	307	18,900	44,100	65,400	18,900
Apr.			16	1,090	† 4	106	684	40,700	38,713	58,600	6,080
May			24	1,140	17	428	842	51,800	46,247	64,900	2,280
June			16	1,200	30	0	891	53,000	47,707	68,900	841
July			27	198	† 1	0	46.8	2,880	41,280	63,000	2,880
Aug.			20	814	2	363	620	38,100	49,450	68,900	30,200
Sept.			24	980	1	710	877	52,200	52,767	67,500	18,500
Oct.			†12	1,060	2	780	960	59,100	50,050	69,000	23,000
Nov.			16	1,030	† 2	0	811	48,200	45,717	63,500	27,300
Dec.			6	910	30	673	795	48,900	48,867	65,500	35,900
Yearly				1,200		0	668	483,480	556,681	740,000	320,701

† And other days Ø Mean daily

RIO GRANDE AT EAGLE PASS, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and winch, located .5 mile above the international highway bridge between Eagle Pass, Texas and Piedras Negras, Coahuila, and 754.6 river miles below the American Dam at El Paso, Texas. The zero of the gage is 682.91 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 116 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 to March 1914; August 1914 to April 1916; September 1916; September and October 1917; October 1918; September and October 1919; August and September 1920; June 1922; September, November, and December 1923; and January 1924 through December 1954.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow was ** 964,100 second-feet, which occurred on June 29, 1954, with a gage height of 53.51 feet. The flood of September 2, 1932 reached a discharge of 569,000 second-feet, with a gage height of 48.92 feet. The lowest recorded flow was 24.4 second-feet, which occurred on June 22, 1953, with a gage height of .07 foot.

Much well-authenticated information indicates that a greater flood than that of 1954 occurred in June 1865 along the Rio Grande from Jiménez, Coahuila, Mexico, 32.3 miles above Eagle Pass, Texas, to the Gulf of Mexico. The flood reached a gage height of about 56 feet at the site of the present Eagle Pass station, with an estimated discharge of about 1,250,000 second-feet.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	759	1,120	568	312	13,490	2,590	21,370	2,750	6,960	16,170	1,740	1,260
2	745	1,040	558	298	2,870	2,130	10,100	2,330	6,250	4,940	1,900	1,260
3	731	1,000	498	285	2,090	1,820	9,010	1,910	5,720	3,400	1,780	1,260
4	717	915	544	275	1,620	1,520	8,020	1,970	4,700	2,990	1,600	1,280
5	720	908	491	275	1,440	1,480	7,200	1,910	4,340	3,220	1,440	1,300
6	727	915	455	275	1,290	1,590	6,600	1,780	4,030	4,310	1,360	1,320
7	724	918	455	276	1,180	1,330	6,000	1,910	3,740	7,910	1,480	1,320
8	720	883	455	297	1,070	1,120	5,540	2,900	3,600	3,850	1,920	1,330
9	720	858	463	424	1,050	971	5,190	3,250	3,850	3,010	1,500	1,330
10	717	869	470	639	989	939	4,700	3,990	3,570	2,850	1,500	1,330
11	713	759	480	1,450	837	1,670	4,480	3,110	3,100	3,180	1,540	1,300
12	720	671	491	1,090	699	1,620	4,410	2,650	2,800	3,370	1,450	1,280
13	766	667	487	2,470	650	2,010	4,340	2,370	2,700	3,380	1,520	1,260
14	766	664	487	3,920	632	1,740	3,490	2,470	2,580	3,070	1,590	1,270
15	763	660	484	6,750	540	16,000	3,040	2,650	2,440	2,910	1,670	1,280
16	766	660	480	19,320	597	58,980	3,260	2,470	2,420	3,100	1,630	1,240
17	770	629	480	7,700	565	42,730	2,700	2,330	2,290	2,750	1,590	1,190
18	773	604	484	4,340	643	8,860	2,710	2,070	2,180	2,510	1,550	1,180
19	795	607	484	3,360	1,650	5,930	2,390	1,970	2,020	2,220	1,540	1,180
20	780	604	445	2,510	1,890	4,310	2,220	1,970	1,990	2,030	1,530	1,180
21	788	625	410	2,030	1,530	3,320	2,390	2,120	1,930	1,900	1,530	1,250
22	798	622	374	1,540	2,070	2,730	2,280	2,070	1,980	1,830	1,520	1,280
23	724	593	374	6,920	4,100	2,310	2,100	3,990	1,860	1,780	1,490	1,350
24	724	593	364	21,970	7,200	1,920	2,160	6,460	1,840	1,750	1,460	1,420
25	724	650	353	5,610	13,380	1,770	2,280	10,810	1,620	1,650	1,440	1,420
26	720	650	353	3,400	14,730	2,330	2,280	7,980	1,780	1,620	1,400	1,400
27	717	643	329	2,500	9,570	24,230	2,050	9,220	1,850	1,580	1,350	1,350
28	819	579	317	1,960	6,670	572,100	1,990	11,690	1,800	1,570	1,310	1,350
29	925		318	1,700	4,450	561,500	1,940	12,400	1,800	1,500	1,270	1,400
30	904		321	6,500	3,340	76,990	1,990	8,550	2,000	1,550	1,270	1,200
31	953		325		2,770		1,890	8,160		1,600		1,300
Sum	23,688	20,906	13,597	110,396	105,602	1,408,540	140,120	132,210	89,740	99,500	45,870	40,070

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	1.67	1.31	31	1,150	11	713	764	46,990	161,395	365,000	42,690
Feb.	1.67	1.15	1	1,120	28	572	747	41,470	144,033	398,200	33,320
Mar.	1.21	.72	2	600	28	284	439	26,970	135,167	247,440	26,970
Apr.	11.48	.69	24	32,100	3	273	3,680	219,000	130,516	270,700	14,770
May	10.76	1.18	1	27,370	15	540	3,410	209,500	218,628	* 918,000	8,430
June	53.51	1.41	29	**964,100	9	795	46,950	2,794,000	330,778	2,794,000	4,530
July	11.42	2.85	1	31,780	31	1,780	4,520	277,900	261,422	* 1,255,000	29,300
Aug.	6.96	2.89	29	∅ 12,400	6	∅ 1,780	4,260	262,200	261,781	* 947,000	50,080
Sept.	5.09	2.72	1	∅ 6,960	26	1,580	2,990	178,000	506,677	3,079,000	27,050
Oct.	8.01	2.69	1	∅ 16,170	30	1,340	3,210	197,400	381,829	1,680,300	31,560
Nov.	3.41	2.40	5	3,070	30	1,240	1,530	90,980	184,513	512,800	35,630
Dec.	2.49	2.30	6	1,380	20	1,110	1,290	79,480	160,020	369,760	41,000
Yearly	53.51	.69		**964,100		273	6,110	4,423,890	2,876,759	6,946,510	708,110

* Partly estimated ∅ Mean daily ** Determined by slope-area calculations

RIO ESCONDIDO AT VILLA DE FUENTE, COAHUILA

DESCRIPTION: From September 1932 until November 1954, a water-stage recorder and cable with sit-down cable car was located 3.1 miles southwest of Piedras Negras, Coahuila, on the outskirts of Villa de Fuente, 5 miles above the confluence with the Rio Grande. This stream enters the Rio Grande 758.2 river miles below the American Dam at El Paso, Texas. The zero of the gage was 717.78 feet above mean sea level, U.S.C. & G.S. datum. In November 1954, the water-stage recorder was moved 1.2 miles downstream and the zero of the gage was changed to 708.78 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 44 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: 1922 through December 1954. The records from 1922 to September 1932 are considered doubtful.

REMARKS: Diversions and drainage returns modify the flow of this spring-fed stream at this station. Backwater from the Rio Grande reached an elevation of 729.92 feet during the flood of June 1954.

EXTREME FLOWS FROM RECORDS: ⊕ Momentary: Max. 24,000 second-feet on June 29, 1936, with a gage height of 19.13 feet. Min. .4 second-foot on November 4, 1934, with a gage height of .75 foot, and in June, July, and August 1953, with a gage height of 2.17, 1.05, and .92 foot, respectively.

Average Flow in Second-Feet

Daily:	Max. 6,710	June 29, 1936	Min. .4	Several days 1953
Monthly:	Max. 647	Oct. 1932	Min. 1.0	Sept. 1945
Yearly:	Max. 83.2	1935	Min. 11.0	1943

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.3	14.8	8.1	9.2	10.2	44.5	47.7	4.2	1.8	1.4	4.2	5.3
2	6.7	14.5	8.1	9.2	9.2	38.5	43.1	4.2	2.5	1.4	4.2	5.3
3	7.4	14.1	8.5	8.8	9.2	34.6	36.7	4.2	3.2	1.1	4.2	5.3
4	8.1	14.1	8.5	8.8	8.8	28.6	33.5	2.5	3.2	1.1	4.2	4.6
5	8.8	11.7	8.5	8.8	8.8	18.7	33.5	3.2	3.2	1.1	3.9	3.2
6	9.5	11.3	8.5	8.8	9.2	15.5	30.4	4.2	3.2	32.8	3.9	3.2
7	10.2	11.3	9.2	8.1	9.2	18.7	30.4	2.5	4.2	9.5	4.2	3.5
8	10.2	12.7	9.6	7.4	9.2	18.7	30.4	1.8	4.2	6.7	3.5	5.7
9	10.2	13.4	9.6	16.2	9.2	18.7	28.6	1.8	4.2	5.7	3.5	5.6
10	10.2	14.5	8.8	9.5	9.5	6.4	26.8	1.8	4.2	5.7	3.5	5.7
11	10.2	14.5	8.8	8.1	8.5	4.9	26.8	1.8	4.2	5.7	3.9	5.6
12	10.2	14.5	8.8	7.4	8.5	4.2	26.8	1.8	4.9	5.7	3.9	5.7
13	10.2	14.5	8.8	8.1	9.5	4.9	26.8	1.8	4.9	5.0	3.9	5.6
14	8.8	14.1	8.8	96.1	9.2	4.9	30.4	1.1	2.5	5.0	3.9	5.7
15	9.9	14.1	8.8	29.3	8.1	420	30.4	1.1	1.4	5.0	3.9	5.6
16	9.9	14.1	10.6	19.1	8.1	61.1	28.6	1.1	1.4	5.0	4.2	6.0
17	8.8	14.5	10.6	15.9	8.1	47.7	28.6	1.1	1.4	4.9	4.2	6.0
18	8.5	14.8	9.5	16.2	8.1	41.0	30.4	1.1	1.4	4.2	5.0	6.0
19	7.8	13.1	9.2	16.6	8.1	38.8	28.6	1.1	1.0	4.2	5.0	6.0
20	7.8	13.4	9.2	14.5	8.5	36.7	28.6	28.6	1.1	4.2	4.2	5.7
21	7.8	13.4	8.5	14.5	8.5	35.0	28.6	4.2	1.1	4.2	4.2	3.9
22	8.5	13.1	8.5	12.7	87.9	33.5	28.6	1.8	1.0	4.2	4.6	3.9
23	7.8	12.0	9.9	14.5	4,940	33.5	26.8	1.4	1.1	4.2	5.3	3.9
24	7.8	12.4	9.9	14.5	1,730	33.5	6.4	1.4	1.1	4.2	4.6	3.9
25	7.8	10.6	10.2	15.9	257	36.7	1.4	1.4	1.1	4.2	3.9	4.9
26	7.8	10.6	10.2	14.0	93.6	119	1.1	1.4	1.0	4.2	3.9	4.2
27	7.8	8.5	9.5	14.0	512	87.6	3.2	1.4	1.1	4.2	5.3	4.2
28	12.7	8.5	9.5	13.1	143	47.7	4.2	1.1	1.1	4.2	5.3	5.3
29	14.8		9.9	12.7	80.2	85.5	4.2	1.1	1.1	4.2	4.9	6.0
30	15.9		9.9	11.7	55.4	56.1	4.2	1.4	1.0	4.2	5.0	6.0
31	14.8		9.2		51.2		4.2	1.8		4.2		6.0
Sum	292.2	363.1	285.7	463.7	8,136.0	1,475.2	740.0	89.4	68.8	161.6	128.4	157.5

Current Year 1954 — Period Oct. 1932-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	1.67	1.38	30	15.9	1	Ø 5.3	9.4	580	2,254	15,990	266
Feb.	1.74	1.44	15	15.2	†27	8.5	13.0	720	1,513	9,990	179
Mar.	1.51	1.44	†16	10.6	† 1	8.1	9.2	567	1,317	6,910	206
Apr.	3.97	1.38	14	325	† 8	7.4	15.5	920	1,585	7,510	195
May	18.44	1.41	23	17,870	†15	8.1	262	16,140	4,199	23,850	494
June	8.33	1.15	15	2,340	12	4.2	49.2	2,930	2,773	19,730	91.6
July	1.84	.98	1	49.8	†26	1.1	23.9	1,470	1,906	9,740	101
Aug.	1.71	.98	20	41.0	†14	1.1	2.9	177	* 2,276	* 20,830	77.8
Sept.	1.18	.98	†12	4.9	†19	1.0	2.3	136	3,238	21,590	57.5
Oct.	3.67	.95	6	249	† 3	1.1	5.2	321	3,173	39,790	109
Nov.	1.28	1.18	23	6.0	† 8	3.5	4.3	255	2,014	25,590	101
Dec.	.66	.39	†16	6.0	7	2.1	5.1	312	2,059	20,720	260
Yearly	18.44	.39		17,870		1.0	33.9	24,528	28,307	60,241	7,969

* Partly estimated † And other days Ø Mean daily ⊕ Period October 1932-1954

RIO GRANDE AT SAN ANTONIO CROSSING NEAR VILLA GUERRERO, COAHUILA

DESCRIPTION: Water-stage recorder located at San Antonio Crossing, .5 mile below Cuervo Creek, which marks the lower end of the Maverick Irrigation District, 34.8 river miles below Eagle Pass, Texas and Piedras Negras, Coahuila, 5 miles northeast of Villa Guerrero, Coahuila, and 789.4 river miles below the American Dam at El Paso, Texas. This station was moved 1,100 feet downstream on January 1, 1954 and the zero of the gage was changed from 581.53 feet to 579.72 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 16 meter measurements during the year and a continuous record of gage heights during the periods of low and medium flows. Computations by shifting channel methods. Records available: March, April, May, October, November, and December 1952, with some days missing; January 1 through August 20, 1953; and September 23, 1953 through June 14, 1954.

REMARKS: This station was first installed for temporary use in connection with a loss and gain study made in 1952 on the Rio Grande between Jiménez Station and this station, and was continued during periods of low and medium flows. The new station, placed in operation on January 1, 1954, was destroyed by the June 1954 flood.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	945	1,220	736	432	13,600	2,780						
2	931	1,200	755	406	4,160	2,330						
3	931	1,120	678	395	2,530	2,040						
4	972	1,040	662	391	1,830	1,910						
5	965	1,020	666	420	1,740	1,760						
6	938	1,070	689	454	1,660	1,840						
7	* 951	1,050	682	465	1,440	1,760						
8	* 958	1,030	686	476	1,260	1,420						
9	* 951	986	686	948	1,120	1,200						
10	* 979	972	655	877	1,090	1,100						
11	* 979	917	655	954	1,010	1,430						
12	1,010	818	624	1,570	931	1,860						
13	1,020	818	613	951	864	2,170						
14	1,010	838	605	5,410	864	2,180						
15	1,010	831	628	5,130	838							
16	986	831	628	13,400	786							
17	951	799	586	9,890	838							
18	965	786	582	5,710	1,040							
19	951	724	609	4,060	986							
20	951	736	658	3,120	2,360							
21	965	786	662	2,450	1,970							
22	951	818	655	1,970	1,590							
23	917	767	628	1,740	8,060							
24	951	730	598	21,100	10,600							
25	945	755	541	7,930	9,000							
26	951	730	533	5,240	13,600							
27	965	724	537	3,560	10,900							
28	1,090	761	518	2,650	6,500							
29	1,170		499	2,020	5,450							
30	1,140		495	2,090	4,080							
31	1,090		465		3,180							
Sum	30,489	24,877	19,214	106,209	115,877							

Current Year 1954 — Period # 1952-1954

Month	Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Acre-Feet Average	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	2.36	1.78	28	1,300	23	884	984	60,500	57,115	60,500	53,730
Feb.	2.38	1.45	1	1,320	19	675	888	49,300	46,285	49,300	43,270
Mar.	1.65	.80	2	799	31	439	620	38,100	50,100	60,150	38,100
Apr.	7.28	.66	24	29,800	4	387	3,540	211,000	118,985	211,000	26,970
May	6.98	1.58	1	26,100	†15	755	3,740	230,000	124,070	230,000	18,140
June											
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											
Yearly											

* Partly estimated † And other days # Some months missing

RIO GRANDE AT LAREDO, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car. The recorder is located on the downstream side of the first pier from the Mexican end of the railroad bridge between Laredo, Texas and Nuevo Laredo, Tamaulipas, 884.3 river miles below the American Dam at El Paso, Texas. The cable is located 1.4 miles upstream from the railroad bridge. The zeros of the gages at the recorder and at the cable are 351.51 feet and 352.89 feet, respectively, above mean sea level, U.S.C. & G.S. datum. This station and cableway were destroyed by the June-July 1954 flood. On July 15, a temporary recorder, with zero of the gage at 351.51 feet, was installed 650 feet downstream from the railroad bridge. After this date, boat measurements were made at a point approximately 2,600 feet downstream from the railroad bridge.

RECORDS: Based on 126 meter measurements during the year, 125 by the Mexican and 1 by the United States Section of this Commission, and a continuous record of gage heights, except for the period July 1-14, when gage heights were observed every four hours. Computations by shifting channel methods. Records available: May 1900 through December 1913; May, June, and October 1914; September 1916; September and October 1917; October 1918; September and October 1919; August and September 1920; June, November, and December 1922; and January 1923 through December 1954. Gage-height records are available for January, February, and March 1914.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow at this station was ** 716,900, which occurred June 30, 1954, with a gage height of 61.35 feet. The lowest recorded flow was zero, which occurred various days in June and July 1953, with a gage height of 2.30 feet.

Much well-authenticated information indicates that a greater flood than that of 1954 occurred in June 1865 along the Rio Grande from Jiménez, Coahuila, Mexico, 32.3 miles above Eagle Pass, Texas, to the Gulf of Mexico. The flood reached a gage height of about 62.5 feet at the site of the present Laredo railroad bridge, with an estimated discharge of about 950,000 second-feet.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	833	1,340	551	318	2,210	3,130	142,300	2,560	10,450	2,420	1,870	1,730
2	784	1,120	607	296	14,510	2,680	27,510	2,550	8,440	10,880	1,950	1,730
3	855	1,290	632	300	4,170	2,550	16,070	3,810	8,120	9,850	1,950	1,730
4	830	1,080	653	304	2,610	2,300	12,710	2,920	7,560	4,340	2,290	1,730
5	833	1,020	611	275	2,070	2,010	11,190	2,410	6,430	5,930	2,160	1,730
6	876	961	512	279	1,730	1,820	9,920	2,430	5,400	6,220	1,940	1,730
7	848	961	537	269	1,550	1,640	8,690	2,360	5,230	5,090	1,660	1,730
8	855	961	561	324	1,410	1,710	8,190	2,050	4,840	10,880	1,730	1,660
9	893	936	547	7,060	1,310	1,390	8,440	2,240	4,450	6,530	1,870	1,660
10	865	936	593	4,800	1,170	1,120	7,560	3,740	4,380	4,630	2,290	1,590
11	869	883	537	2,290	1,080	971	7,170	4,170	4,480	3,640	1,940	1,660
12	876	883	512	961	992	904	6,600	4,240	4,100	3,500	1,870	1,660
13	897	827	491	1,120	868	1,450	5,830	3,380	3,740	4,100	1,940	1,590
14	918	798	466	2,140	773	1,630	5,400	2,880	3,600	4,200	1,870	1,660
15	904	745	463	8,580	664	2,120	4,800	2,700	3,520	3,960	1,870	1,660
16	904	745	445	6,430	674	13,350	3,810	3,030	3,570	3,570	1,940	1,660
17	939	724	498	16,000	621	39,900	3,850	3,240	3,600	3,400	1,940	1,730
18	876	724	516	9,110	529	48,380	3,880	2,790	3,400	3,640	1,870	1,590
19	876	678	512	5,090	1,590	12,400	3,360	2,660	3,200	3,260	1,800	1,590
20	883	678	459	3,600	2,150	6,570	3,270	2,690	3,000	2,880	1,730	1,660
21	886	580	480	3,170	1,640	5,230	2,930	2,650	2,930	2,570	1,730	1,660
22	858	580	547	2,390	1,940	4,100	2,690	2,520	2,870	2,420	1,730	1,660
23	862	678	516	1,950	3,030	3,450	2,900	2,220	2,710	2,280	1,730	1,660
24	900	678	512	2,310	13,000	2,860	2,830	2,600	2,720	2,140	1,730	1,660
25	872	579	463	19,490	13,380	2,520	2,570	5,050	2,730	2,090	1,730	1,730
26	900	530	417	7,590	13,420	2,520	2,670	12,080	2,380	2,090	1,730	1,870
27	830	579	406	4,630	24,970	2,150	2,950	10,740	2,300	2,040	1,800	1,870
28	823	579	396	4,980	13,140	14,690	2,790	9,750	2,290	1,970	1,870	1,870
29	886		424	3,130	7,170	244,400	2,430	11,050	2,440	1,900	1,730	1,800
30	1,090		392	2,210	5,400	575,600	2,410	14,410	2,430	1,880	1,730	1,800
31	1,460		353		3,990		2,740	11,370		1,740		1,870
Sum	27,781	23,073	15,609	121,396	143,761	1,005,545	330,460	143,290	127,310	126,040	55,990	52,930

Month	Current Year 1954 — Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period 1924-1954 — Acre-Feet Average	Maximum	Minimum
Jan.	5.12	3.97	31	2,390	2	752	896	55,100	163,593	351,700	54,800
Feb.	4.76	3.71	1	1,760	26	530	824	45,770	145,896	423,700	41,050
Mar.	3.67	3.28	4	735	31	334	504	30,960	136,509	223,400	30,960
Apr.	10.99	3.08	25	24,900	5	254	4,050	240,800	139,212	316,300	28,300
May	12.07	3.74	27	31,390	†17	529	4,640	285,100	252,863	856,000	33,360
June	61.35	4.10	30	**716,900	12	879	33,520	1,994,000	338,189	1,994,000	337
July	46.19	4.59	1	293,100	30	2,300	10,660	655,500	283,945	1,250,000	17,470
Aug.	8.27	4.43	30	14,830	8	1,980	4,620	284,200	273,517	883,000	56,080
Sept.	7.15	4.36	1	10,840	28	2,130	4,240	252,500	529,717	2,943,000	30,900
Oct.	10.37	4.40	2	21,750	31	1,740	4,070	250,000	415,087	1,951,000	31,910
Nov.	4.79	4.27	10	2,830	29	1,590	1,870	111,100	191,588	570,800	43,110
Dec.	4.43	4.27	28	1,940	†10	1,590	1,710	105,000	165,280	352,700	52,230
Yearly	61.35	3.08		**716,900		254	5,950	4,310,030	3,035,396	7,017,110	1,010,830

† And other days ** Determined by slope-area calculations.

RIO SALADO AT LAS TORTILLAS, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car and control wall with notch opening capacity of 2,500 second-feet, located 6.2 miles southeast of the town of Las Tortillas, Tamaulipas, 2 miles below the confluence of the Río Sabinas with the Río Salado, and 24.8 miles above the confluence of the Río Salado with the Rio Grande. This confluence is 946.1 miles below the American Dam at El Paso, Texas. The zero of the gage is 325.72 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 104 meter measurements during the year, a stable rating curve up to 2,500 second-feet, and a continuous record of gage heights. Computations by shifting channel methods for flows greater than 2,500 second-feet. Records available: September 9, 1953 through December 1954. Records are also available for a station located at Cd. Guerrero, 18.6 miles downstream, from 1900 through 1913 and 1923 through September 8, 1953. The drainage area above the Cd. Guerrero station is 242 square miles larger than that above this station.

REMARKS: Reservoirs and irrigation diversions modify the flow at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 12,400 second-feet on May 19, 1954, with a gage height of 9.15 feet. Min. frequently no flow. Extreme flow data for the station at Cd. Guerrero, prior to 1954, may be found in previous water bulletins.

Average Flow in Second-Feet

Daily:	Max. 7,450	May 19, 1954	Min. 0	Frequently	
Monthly:	Max. 736	May 1954	Min. 0	Mar. & Dec. 1954	

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.6	.1	0	0	0	154	2.5	1.3	0	6.0	0	0
2	.4	.1	0	0	0	119	.7	.3	0	2.5	0	0
3	.3	.1	0	0	0	107	.4	0	0	2.5	0	0
4	.2	.1	0	0	0	95.7	0	0	0	101	0	0
5	.1	.1	0	0	0	87.6	0	0	0	220	0	0
6	.1	.1	0	0	0	63.6	0	0	0	160	0	0
7	.1	.1	0	0	0	56.5	0	0	34.6	109	0	0
8	.1	.1	0	0	0	37.4	0	0	2.5	706	0	0
9	.1	.1	0	2,930	0	27.2	0	0	6.0	689	0	0
10	.1	.1	0	3,880	0	14.8	0	0	8.5	614	509	0
11	.1	.1	0	1,150	0	8.5	0	0	4.6	491	59.0	0
12	.1	.1	0	526	0	2.5	0	0	1.4	178	143	0
13	.1	.1	0	338	0	.7	0	0	.7	86.9	306	0
14	.1	.1	0	144	0	0	0	0	0	52.6	134	0
15	.1	.1	0	74.2	0	0	0	0	0	27.9	70.3	0
16	.1	.1	0	49.4	0	0	0	0	0	14.8	40.6	0
17	a 0	.1	0	56.1	0	0	0	0	0	8.5	19.4	0
18	a 0	.1	0	275	55.1	0	0	0	2.5	6.0	11.7	0
19	a 0	.1	0	138	7,450	0	0	0	.4	4.6	6.0	0
20	a 0	.1	0	77.0	3,850	0	0	0	0	2.5	6.0	0
21	a 0	a 0	0	35.7	2,010	0	0	0	0	2.5	4.6	0
22	.1	a 0	0	21.5	416	0	0	0	0	1.4	2.5	0
23	.1	a 0	0	16.2	593	0	0	0	0	.7	1.4	0
24	.1	a 0	0	9.5	1,550	0	0	0	756	.7	.7	0
25	.1	a 0	0	3.9	1,860	50.1	0	0	317	.4	.4	0
26	.1	a 0	0	1.1	1,400	158	0	0	166	0	0	0
27	.1	a 0	0	0	1,110	21.9	0	0	78.4	0	0	0
28	.1	a 0	0	0	1,290	18.4	0	0	38.1	0	0	0
29	.1		0	0	621	6.0	0	0	15.2	0	0	0
30	.1		0	0	395	4.6	26.2	0	8.5	0		0
31	.1		0		205		13.1	0		0		
Sum	3.7	2.0	0	9,725.6	22,805.1	1,033.5	42.9	1.6	1,440.4	3,488.5	1,314.6	0

Month	Extreme Gage Feet		Current Year 1954 Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1953-1954 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			1	.7	†17	a 0	.1	7.3			
Feb.			† 1	.1	†21	a 0	.1	4.0			
Mar.					† 1	0	0	0			
Apr.	3.44		9	4,800	† 1	0	324	19,300			
May	9.15		19	12,400	† 1	0	736	45,230			
June	1.21		26	284	†14	0	34.4	2,050			
July	1.21		30	298	† 4	0	1.4	85.1			
Aug.	.10		1	1.4	† 3	0	.1	3.2			
Sept.	3.02		24	2,060	† 1	0	48.0	2,860			
Oct.	2.43		10	1,290	†26	0	113	6,920	16,405	25,890	6,920
Nov.	2.43		10	1,300	† 1	0	43.8	2,610	2,015	2,610	1,420
Dec.					† 1	0	0	0	u 84.5	u 169	0
Yearly	9.15			12,400		0	109	79,069.6			

u Estimated † And other days a Flow less than .1 second-foot.

RIO GRANDE AT CHAPENO, TEXAS

DESCRIPTION: Two water-stage recorders, side by side (one conventional and one bubbler type), located 2.5 miles below Falcón Dam, 11.2 river miles above the confluence of the Río Alamo with the Rio Grande, and 973.4 river miles below the American Dam at El Paso, Texas. A cable with stand-up cable car equipped for winch and heavy weights is located approximately 4,000 feet below the recorder. The zero of the gage was lowered on March 9, 1954 from 173.26 feet to 171.52 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 81 meter measurements made during the year, 60 by the United States and 21 by the Mexican Section of this Commission. Computations by shifting channel methods. Records available: December 17, 1952 through December 1954.

REMARKS: This station was placed in operation on December 17, 1952. Except for tributary inflows below Falcón Dam, flow at this station after August 25, 1953 was controlled largely by requested releases and spill from Falcón Reservoir.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 22,600 second-feet on August 27, 1953, with a gage height of 7.98 feet, caused by arroyo inflow below Falcón Dam. Min. zero flow occurred on June 17 through July 1, 1953, before storage began at Falcón Dam.

Average Flow in Second-Feet

Daily:	Max.	12,200	June 29, 1954	Min.	0	June 17 through July 1, 1953
Monthly:	Max.	5,830	June 1954	Min.	7.8	June 1953
Yearly:	Max.	2,900	1954	Min.	943	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,410	3,980	3,960	6,240	2,500	7,840	3,760	1,710	1,580	413	820	1,510
2	1,640	3,960	4,290	5,470	2,510	7,880	3,490	1,710	1,870	1,080	820	1,340
3	1,810	3,710	4,280	5,350	2,900	8,080	2,820	1,710	1,870	1,090	874	1,510
4	1,890	3,290	3,980	6,300	3,540	7,390	3,160	1,790	2,300	789	1,020	1,840
5	2,260	4,150	3,850	6,230	3,370	7,220	1,390	1,860	2,650	92.8	986	1,820
6	2,730	4,720	3,430	6,180	* 3,180	7,100	443	2,030	2,730	124	1,000	1,900
7	2,590	4,830	3,160	3,830	* 3,000	7,170	874	2,280	2,650	104	1,000	1,900
8	2,710	4,910	3,850	1,650	2,910	7,170	869	2,500	2,650	195	1,000	2,040
9	3,170	5,370	4,260	1,250	2,770	6,430	900	3,600	2,650	113	1,020	2,060
10	3,320	4,780	5,500	* 16.5	2,610	6,630	1,020	4,320	2,910	170	670	2,020
11	3,030	4,790	5,230	ᵛ 10.0	2,530	6,890	997	4,170	3,360	696	38.0	2,060
12	2,700	5,250	5,560	ᵛ 10.0	2,530	6,820	1,010	4,050	2,040	657	340	1,940
13	3,120	5,400	5,500	* 13.2	2,420	6,830	1,090	3,850	3,280	322	861	1,900
14	3,370	5,550	5,470	32.6	2,460	6,800	1,230	4,240	1,520	304	928	2,000
15	3,950	6,060	5,470	23.1	2,850	6,810	963	4,580	534	768	1,090	1,820
16	4,600	6,500	5,500	17.6	3,830	7,360	760	3,190	778	1,010	1,450	1,260
17	4,830	6,280	5,150	15.9	4,300	5,890	1,030	1,760	1,610	805	1,590	1,530
18	5,040	6,690	4,600	15.8	5,420	5,910	1,260	1,420	1,440	923	1,440	2,000
19	5,250	6,480	3,320	15.7	5,780	5,870	1,320	1,460	1,250	957	1,260	1,900
20	4,770	6,450	2,520	17.7	5,400	5,540	1,420	1,510	1,340	945	1,510	1,740
21	2,620	6,720	2,750	18.7	6,030	5,030	1,540	1,980	1,580	1,030	1,510	1,430
22	1,020	6,630	3,840	77.8	7,860	4,200	1,630	2,150	1,500	988	1,490	1,060
23	2,300	6,580	3,820	362	7,740	4,480	1,640	2,110	1,360	879	1,230	1,110
24	3,540	6,350	3,820	457	7,790	3,560	1,820	1,960	1,320	774	1,390	1,860
25	3,700	6,360	3,410	632	7,610	1,260	1,840	1,930	1,450	773	1,410	2,090
26	3,850	6,200	3,780	882	7,890	383	1,980	1,710	1,500	792	1,410	2,090
27	4,040	4,030	4,960	1,340	8,020	83.2	1,800	1,790	1,500	800	1,490	2,090
28	4,030	3,830	5,680	1,860	8,260	2,340	1,960	2,070	1,500	739	1,700	2,060
29	3,970		5,710	2,130	8,480	12,200	1,750	1,780	685	594	1,680	2,000
30	4,200		6,070	2,270	8,450	3,640	1,730	1,510	400	723	1,550	2,110
31	4,000		6,280		7,480		1,750	1,560		819		2,110
Sum	101,460	149,850	139,000	52,717.6	152,420	174,806.2	49,246	74,290	53,807	20,468.8	34,577.0	56,100

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	High	Extreme Second-Feet Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1953-1954 Acre-Feet Average	Maximum	Minimum
Jan.	3.23	.67	18	5,300	21	393	3,270	201,000	125,100	201,000	49,200
Feb.	3.80	1.66	17	7,020	4	1,600	5,350	297,000	165,850	297,000	34,700
Mar.	5.20	2.96	31	6,410	9	1,030	4,480	276,000	172,100	276,000	68,200
Apr.	5.18		1	6,340	†10	ᵛ 10.0	1,760	105,000	78,750	105,000	52,500
May	6.06	3.75	28	9,640	14	2,400	4,920	302,000	175,900	302,000	49,800
June	8.35	1.62	29	16,900	27	77.1	5,830	347,000	173,730	347,000	461
July	4.42	1.82	28	4,330	6	125	1,590	97,700	54,350	97,700	11,000
Aug.	4.71	3.10	9	5,080	18	1,270	2,400	147,000	* 99,400	147,000	* 51,800
Sept.	4.42	1.44	13	4,360	29	69.2	1,790	107,000	130,000	153,000	107,000
Oct.	3.25	1.06	11	1,560	5	38.8	660	40,600	53,250	65,900	40,600
Nov.	4.20	.97	18	3,670	12	22.9	1,150	68,600	69,000	69,400	68,600
Dec.	3.57	2.82	† 8	2,200	23	834	1,810	111,000	93,750	111,000	76,500
Yearly	8.35			16,900		ᵛ 10.0	2,900	2,099,900	1,391,180	2,099,900	682,461

ᵛ Estimated * Partly estimated † And other days

RIO ALAMO AT CD. MIER, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with sit-down cable car and reinforced concrete weir for measuring flows up to 177 second-feet, located 3.1 miles above the confluence of the Río Alamo with the Rio Grande, and .6 mile west of Cd. Mier, Tamaulipas, at a point called "El Paso del Cántaro". This stream enters the Rio Grande 984.6 river miles below the American Dam at El Paso, Texas. On June 11, 1952, the recorder was moved from a point 230 feet above a new highway bridge to a point 285 feet below the bridge and 312 feet above the weir. The zero of the gage is 188.35 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 11 meter measurements made at high flows during the year, the weir discharge table at low flows, and a continuous record of gage heights. High-flow computations by shifting channel methods. Records available: July 1, 1923 through December 1954.

REMARKS: Small reservoirs and irrigation diversions modify the flow of this spring-fed stream at this station.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 144,800 second-feet on September 11, 1948, with a gage height of 33.56 feet. Periods of no flow have occurred at times during all years of record, except 1934 and 1935.

Average Flow in Second-Feet

Daily:	Max. 87,230	Sept. 11, 1948	Min. 0		Frequently
Monthly:	Max. 5,170	Sept. 1948	Min. 0		Frequently
Yearly:	Max. 536	1953	Min. 16.4		1929

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	13.1	1.1	0	0	5.7	12.0	0	28.3	0	0	1.1	1.8
2	14.5	1.0	0	0	3.9	9.2	0	6.7	0	0	1.8	1.1
3	14.5	1.0	0	0	2.8	6.0	0	2.2	0	0	2.5	2.1
4	12.0	1.0	0	0	1.8	4.2	0	0	0	0	1.8	2.1
5	10.6	.4	0	0	.7	3.5	0	0	0	2.1	.7	1.8
6	10.6	0	0	0	0	2.5	0	0	48.7	84.7	0	1.1
7	8.1	0	0	0	0	2.1	0	0	36.7	35.6	0	.4
8	6.0	0	0	0	0	0	0	0	108	689	0	0
9	6.0	0	0	7,240	.4	0	0	0	63.9	1,050	350	0
10	6.0	0	0	6,920	.7	0	0	0	13.4	364	243	0
11	4.2	0	0	385	1.8	0	0	0	4.6	79.4	38.1	0
12	4.2	0	0	63.6	110	0	0	0	2.1	33.2	15.5	1.4
13	4.2	0	0	33.2	33.5	0	0	0	.7	17.3	9.5	1.1
14	4.2	0	0	39.9	10.6	0	0	0	0	10.5	7.8	0
15	3.5	0	0	39.2	4.2	0	0	0	0	307	6.4	0
16	3.5	0	0	547	1.8	0	0	0	0	216	5.3	0
17	2.5	0	0	158	3.5	0	0	0	23.0	46.6	3.5	.7
18	2.5	0	0	40.3	9.9	0	0	0	18.7	25.4	2.5	1.8
19	3.5	0	0	27.5	1,000	0	0	0	4.2	15.8	3.5	2.1
20	3.5	0	0	21.5	1,600	0	0	0	1.4	9.8	3.5	1.4
21	3.5	0	0	19.4	237	0	0	0	0	8.4	2.8	0
22	3.5	0	0	18.0	198	0	0	0	0	7.0	2.1	0
23	2.5	0	0	15.9	83.7	0	0	0	0	19.7	1.8	0
24	2.5	0	0	15.9	445	0	0	0	0	4.9	2.1	0
25	2.5	0	0	13.4	280	75.2	0	0	0	3.1	1.8	.7
26	2.5	0	0	10.9	62.9	427	0	0	0	2.1	1.8	.7
27	1.8	0	0	9.9	40.3	115	0	0	0	2.8	2.5	1.4
28	1.1	0	0	9.2	25.4	27.9	0	0	0	3.1	1.8	3.5
29	1.1		0	6.7	19.4	9.5	0	0	0	2.4	2.1	6.0
30	2.5		0	5.7	15.2	4.2	0	0	0	1.7	2.1	6.4
31	1.1		0		13.8		57.2	0		1.0		4.9
Sum	161.8	4.5	0	15,640.2	4,212.0	698.3	57.2	37.2	325.4	3,042.6	717.4	42.5

Current Year 1954 | Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	.26	.03	† 2	14.5	†28	1.1	5.2	321	4,067	34,920	0
Feb.	.03		† 1	1.1	† 6	0	.2	8.9	2,871	25,550	0
Mar.			† 1	0	† 1	0	0	0	2,933	19,830	0
Apr.	10.63		10	14,060	† 1	0	521	31,020	7,378	33,990	0
May	4.72		19	3,850	† 6	0	136	8,350	14,756	* 137,000	0
June	2.00		26	565	† 8	0	23.3	1,390	13,564	83,240	0
July	1.00		31	120	† 1	0	1.8	113	7,022	37,590	0
Aug.	.69		1	67.1	† 4	0	1.2	73.8	20,810	205,700	0
Sept.	1.64		8	335	† 1	0	10.8	645	37,957	307,900	* 135
Oct.	2.84		8	1,340	† 1	0	98.1	6,030	16,046	84,630	0
Nov.	2.76		9	1,260	† 6	0	23.9	1,420	3,609	21,940	0
Dec.	.16		30	8.1	† 8	0	1.4	84.3	3,443	15,000	0
Yearly	10.63			14,060		0	68.3	49,456.0	134,456	387,800	11,908.7

* Partly estimated † And other days

RIO GRANDE AT ROMA, TEXAS

DESCRIPTION: Water-stage recorder at the international bridge between Roma, Texas and Cd. Miguel Alemán (formerly San Pedro), Tamaulipas, 14.9 river miles above the confluence of the Río San Juan from Mexico, and 992.0 river miles below the American Dam at El Paso, Texas. Measurements are made from the bridge. The zero of the gage was lowered 3.28 feet on January 1, 1951 and is now 142.65 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 174 meter measurements during the year, 163 by the Mexican and 11 by the United States Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: May 1900 and September 1900 through December 1913; October 1914; September and October 1917; September and October 1919; August and September 1920; June 1922, and November 1922 through December 31, 1954, when records of flow at this station were discontinued.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. Except for tributary inflows below Falcón Dam, flow at this station after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 21 miles upstream, and intervening diversions.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow was 203,000 second-feet, which occurred on September 5, 1932, with a gage height of 35.4 feet. There was no flow several days of June and July 1953, at a gage height of 0.0 foot.

Much well-authenticated information indicates that a greater flood than that of 1954 occurred in June 1865 from Jiménez, Coahuila, Mexico (32.2 miles above Eagle Pass, Texas) to the Gulf of Mexico. The flood reached a gage height of about 43.0 feet at the site of the present gage, with an estimated discharge of about 630,000 second-feet.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,370	3,920	3,920	6,110	2,520	7,800	3,850	1,700	1,440	283	802	1,500
2	1,450	3,920	4,200	5,790	2,480	7,730	3,960	1,660	1,760	802	809	1,330
3	1,750	3,920	4,410	5,050	2,530	8,050	2,790	1,650	1,780	1,050	805	1,370
4	1,780	3,100	4,060	6,150	3,270	7,520	2,930	1,680	1,960	1,040	961	1,810
5	1,970	3,990	3,920	6,140	3,090	7,130	2,300	1,820	2,530	371	999	1,550
6	2,670	4,800	3,570	6,070	3,110	7,240	353	1,870	2,610	249	1,010	1,800
7	2,450	4,940	3,280	4,980	3,040	7,170	802	2,070	2,740	364	1,020	1,810
8	2,460	4,800	3,500	1,480	2,870	7,380	893	2,390	2,580	491	1,030	1,970
9	2,920	5,050	3,890	8,860	2,700	6,390	904	2,920	2,610	1,320	1,240	1,950
10	3,150	4,590	5,230	9,040	2,560	6,390	985	4,450	2,620	759	1,650	1,960
11	3,090	4,660	5,120	1,190	2,440	6,710	1,020	4,240	3,240	342	360	1,950
12	2,440	5,120	5,440	177	3,780	6,670	1,020	4,170	3,000	1,080	86.5	1,890
13	2,900	5,010	5,440	99.6	2,590	6,640	1,040	3,740	2,720	350	632	1,800
14	3,050	5,470	5,400	76.6	2,450	6,600	1,220	3,880	1,890	334	834	1,860
15	3,670	5,580	5,440	86.9	2,670	6,600	1,140	4,520	600	911	1,020	1,850
16	4,730	6,570	5,470	428	3,670	6,640	727	3,850	491	1,410	1,300	1,360
17	5,050	6,140	5,440	389	3,920	6,500	798	1,830	1,380	865	1,530	1,320
18	5,010	6,890	4,840	101	5,300	5,790	1,210	1,390	1,660	823	1,450	1,880
19	5,160	6,460	3,780	72.0	6,430	5,720	1,230	1,500	1,230	1,040	1,210	1,830
20	4,910	6,180	2,540	60.4	7,030	5,720	1,330	1,440	1,210	833	1,420	1,770
21	3,490	6,780	2,540	56.1	5,580	5,120	1,410	1,740	1,420	1,000	1,440	1,480
22	989	6,750	3,710	48.7	7,350	4,450	1,670	1,990	1,450	1,050	1,450	1,150
23	1,570	6,710	3,740	129	7,630	4,560	1,680	2,010	1,290	964	1,300	862
24	3,360	6,360	3,710	330	7,950	4,410	1,810	1,870	1,250	759	1,270	1,660
25	3,810	6,430	3,290	506	7,840	2,110	1,850	1,870	1,320	756	1,380	1,980
26	3,920	6,390	3,600	604	7,800	1,350	1,960	1,720	1,420	759	1,380	2,000
27	4,100	4,730	4,310	1,360	8,090	360	1,790	1,670	1,410	777	1,390	2,010
28	3,990	3,710	5,470	1,740	8,120	198	1,960	2,080	1,390	752	1,640	1,990
29	3,780		5,540	2,100	8,330	12,180	1,670	2,070	1,170	583	1,640	1,900
30	4,170		5,790	2,140	8,300	3,740	1,620	1,520	342	576	1,520	1,970
31	3,880		6,070		7,590		1,670	1,500		788		1,980
Sum	99,039	148,970	136,660	71,364.3	153,030	174,868	49,592	72,810	52,513	23,481	34,578.5	53,542

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
	Current Year 1954								Period 1924-1954		
Jan.	5.51	2.33	19	5,190	22	851	3,190	196,400	190,009	467,400	50,170
Feb.	6.40	3.81	18	6,990	4	2,320	5,320	295,500	170,123	402,000	33,730
Mar.	6.14	3.90	31	6,110	19	2,430	4,410	271,100	167,022	325,500	43,160
Apr.	9.84	.95	10	15,570	22	42.4	2,380	141,600	175,092	855,700	41,870
May	7.38	4.07	†20	8,690	1	2,260	4,940	303,500	328,947	706,300	48,340
June	9.91	1.28	29	16,240	28	170	5,830	346,900	356,943	1,586,000	109
July	5.15	1.64	2	4,200	6	265	1,600	98,370	307,642	1,217,000	12,500
Aug.	5.71	3.12	15	4,520	18	1,310	2,350	144,400	319,582	ᵘ 904,000	53,280
Sept.	5.25	1.48	13	4,380	30	215	1,750	104,200	651,495	3,048,000	40,800
Oct.	3.31	1.18	16	1,590	6	117	757	46,570	500,788	2,372,000	24,040
Nov.	3.97	.95	10	2,380	†12	62.2	1,150	68,590	217,609	736,000	35,340
Dec.	3.74	2.43	8	2,090	23	791	1,730	106,200	187,209	565,100	43,200
Yearly	9.91	.95		16,240		42.4	2,930	2,123,330	3,572,461	8,098,000	1,024,050

ᵘ Estimated † And other days

CONTRIBUTIONS FROM RIO SAN JUAN

DESCRIPTION: The discharges reported below are summations of flows which entered the Rio Grande between the gaging stations at Roma and Below Anzaldúas Dam site via various drains and the Río San Juan Channel. The confluence of the Río San Juan and the Rio Grande is 1,007.4 river miles below the American Dam at El Paso, Texas, 7.9 river miles above the Rio Grande City gaging station on the Rio Grande, and 12.4 river miles below Marte Gómez Dam on the Río San Juan.

RECORDS: The water reaching the Rio Grande above the Rio Grande City gaging station was measured at open channel gaging stations on the Ranchería s and Los Fresnos Drains, and the Río San Juan channel flow was measured at a station consisting of water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located opposite Camargo, Tamaulipas, about 3.1 miles above the confluence with the Rio Grande. The water reaching the Rio Grande below Rio Grande City gaging station was measured at open channel gaging stations on the Puertecitos, Huizache, and Morillo Drains. No water was released from Marte Gómez Reservoir for use in the United States during 1954. These records were obtained by the Mexican Section of this Commission, except those of the drains for January and February 1954, which were obtained by the Ministry of Hydraulic Resources of Mexico. Records available: March 1, 1953 through December 31, 1954.

REMARKS: Storm water measured at the above-mentioned drains was deducted and is not reported here. In previous water bulletins, under this page heading, mention was made of additional water from drains not being accounted for in the tables. For this reason, the former period totals were not used here and new period totals were begun in 1953.

Above Rio Grande City Station

Month	Current Year 1954								Period 1953-1954		
	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			†11	25.4	4	11.3	15.2	939	560	939	* 182
Feb.			1	17.7	16	4.2	9.2	516	349	516	* 182
Mar.			8	12.4	1	6.4	8.5	520	351	520	182
Apr.			9	2,900	8	6.4	143	8,480	4,306	8,480	131
May			19	263	3	9.9	33.2	2,040	1,076	2,040	111
June			26	1,550	1	12.0	107	6,390	3,234	6,390	78.6
July			3	43.4	29	16.2	23.0	1,420	732	1,420	43.8
Aug.			29	773	23	10.9	45.9	2,820	34,430	66,040	2,820
Sept.			9	69.6	† 4	9.2	18.0	1,070	147,935	294,800	1,070
Oct.			23	516	20	12.4	58.3	3,580	119,590	235,600	3,580
Nov.			10	1,330	7	14.1	77.3	4,600	20,055	35,510	4,600
Dec.			†30	16.2	7	11.3	14.2	877	2,858	4,840	877
Yearly				2,900		4.2	45.9	33,252	335,476	637,700.4	33,252

Below Rio Grande City Station

Month	Current Year 1954								Period 1953-1954		
	Extreme Gage Feet		Ø Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.			31	42.0	† 1	17.3	24.0	1,490	1,670	* 1,850	1,490
Feb.			17	123	† 1	44.1	72.4	4,010	2,930	4,010	* 1,850
Mar.			1	53.0	26	27.2	38.5	2,370	2,110	2,370	1,850
Apr.			14	64.6	1	28.3	42.0	2,490	2,830	3,170	2,490
May			22	87.9	1	27.9	57.6	3,530	3,730	3,930	3,530
June			27	* 142	2	60.0	98.5	5,860	3,660	5,860	1,460
July			1	121	31	32.5	57.6	3,540	2,460	3,540	1,380
Aug.			1	31.8	28	20.5	24.7	1,520	1,028	1,520	535
Sept.			11	21.5	25	17.7	20.1	1,190	1,150	1,190	1,110
Oct.			27	67.8	1	19.1	34.6	2,140	1,735	2,140	1,330
Nov.			1	41.7	†10	15.5	20.1	1,210	1,150	1,210	1,090
Dec.			31	20.1	22	16.6	18.0	1,110	1,575	2,040	1,110
Yearly				* 142		15.5	42.1	30,460	26,028	30,460	21,595

* Partly estimated † And other days Ø Mean daily

RIO GRANDE NEAR RIO GRANDE CITY, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located about 4 river miles below Rio Grande City, Texas, 3.7 miles northeast of Camargo, Tamaulipas, 7.9 river miles below the confluence of the Río San Juan with the Rio Grande, and 1,015.3 river miles below the American Dam at El Paso, Texas. The zero of the gage is at mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 128 meter measurements during the year, 118 by the United States and 10 by the Mexican Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: May, June, and October 1914; September 1916; September and October 1917; October 1918; September and October 1919; August and September 1920; June 1922; September 1923; January 1924 through December 31, 1954, when records of flow at this station were discontinued and operation of a station began at Fort Ringgold, 3 miles upstream.

REMARKS: Reservoirs, diversions, and drainage returns modify the river flow at this station. Except for tributary inflows below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 44 miles upstream, and intervening diversions.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow was 198,800 second-feet, which occurred on September 5, 1932, with a gage height of 157.4 feet. Zero flow occurred several days in June and July 1953.

Much well-authenticated information indicates that a greater flood than that of 1954 occurred in June 1865 along the Rio Grande from Jiménez, Coahuila, Mexico (32.3 miles above Eagle Pass, Texas) to the Gulf of Mexico, with an estimated discharge of about 590,000 second-feet.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,230	4,000	3,970	6,160	2,290	7,340	3,750	1,720	1,530	377	824	1,600
2	1,390	3,900	4,160	6,190	2,400	7,640	3,820	1,710	1,650	404	841	1,530
3	1,610	4,000	4,400	4,820	2,370	7,950	3,190	1,670	1,820	1,010	874	1,430
4	1,720	3,510	4,250	5,850	2,940	7,860	3,060	1,690	1,840	1,150	937	1,650
5	1,840	3,410	4,120	6,180	3,280	7,140	3,160	1,820	2,350	1,200	1,070	1,770
6	2,350	4,390	3,780	6,100	3,120	7,110	1,390	1,870	2,540	687	1,030	1,860
7	2,550	4,890	3,350	5,850	2,990	6,880	593	2,120	2,760	654	1,040	1,910
8	2,580	4,850	3,140	2,300	2,940	7,060	993	2,230	2,580	439	1,020	1,980
9	2,780	4,970	3,970	9,080	2,790	6,590	1,010	2,520	2,700	1,310	1,030	1,990
10	3,160	4,760	4,810	10,700	2,640	6,210	1,050	3,980	2,610	1,240	2,670	2,010
11	3,210	4,510	5,290	3,220	2,520	6,440	1,110	4,220	2,910	562	1,850	2,000
12	2,780	5,130	5,370	675	3,850	6,540	1,100	4,110	3,160	756	418	2,010
13	2,780	4,930	5,460	318	3,250	6,560	1,060	3,780	2,290	750	243	1,870
14	3,060	5,440	5,450	260	2,520	6,540	1,190	3,700	2,630	368	847	1,840
15	3,440	5,330	5,390	200	2,540	6,550	1,360	4,270	1,320	531	980	1,950
16	4,280	6,430	5,350	266	3,350	6,580	937	4,320	676	1,150	1,170	1,660
17	4,780	6,160	5,340	460	3,860	7,150	700	2,720	845	1,180	1,490	1,270
18	4,760	6,490	4,810	286	4,820	5,430	1,010	1,760	1,740	914	1,530	1,580
19	4,990	6,550	4,200	177	5,730	5,720	1,250	1,490	1,450	909	1,420	1,910
20	4,980	6,110	2,840	141	7,840	5,850	1,310	1,450	1,250	887	1,350	1,830
21	4,380	6,520	2,590	127	6,320	5,280	1,410	1,510	1,320	984	1,530	1,650
22	1,880	6,670	3,220	112	6,700	4,790	1,620	1,980	1,480	1,040	1,550	1,400
23	1,170	6,610	3,720	106	8,070	4,180	1,670	2,010	1,390	* 2,010	1,480	1,100
24	2,890	6,290	3,720	163	7,880	4,530	1,690	1,930	1,290	ᵘ 2,040	1,310	1,220
25	3,730	6,310	3,620	338	8,210	3,530	1,830	1,840	1,270	* 1,190	1,440	1,870
26	3,850	6,290	3,370	451	7,820	4,790	1,840	1,860	1,450	879	1,460	2,010
27	4,040	5,660	3,790	654	8,000	2,110	1,890	1,640	1,470	847	1,440	1,980
28	4,050	3,480	5,400	1,330	7,960	598	1,810	1,870	1,440	995	1,560	2,000
29	3,880		5,570	1,880	8,180	5,840	1,830	2,730	1,440	771	1,700	2,000
30	4,010		5,710	2,170	8,250	5,720	1,640	1,960	765	586	1,670	2,030
31	4,090		6,020		8,000		1,610	1,540		687		2,080
Sum	98,240	147,590	136,180	76,564	153,430	176,508	51,883	74,020	53,966	28,507	37,774	54,990

Current Year 1954 — Period 1924-1954

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	127.10	122.43	20	5,060	23	1,040	3,170	195,000	221,005	521,000	48,400
Feb.	128.46	124.64	19	6,840	5	2,980	5,270	293,000	190,148	410,000	32,500
Mar.	127.67	124.08	31	6,160	21	2,550	4,390	270,000	185,051	401,000	40,800
Apr.	134.27	120.45	9	14,700	†23	95.4	2,550	152,000	190,423	* 850,000	39,900
May	129.71	123.91	20	8,600	1	2,150	4,950	304,000	375,051	833,000	49,600
June	131.05	121.55	29	10,500	29	364	5,880	350,000	446,335	1,737,000	72.0
July	125.90	121.52	† 1	3,900	7	420	1,670	103,000	372,677	1,240,000	14,900
Aug.	126.31	122.85	16	4,440	21	1,320	2,390	147,000	378,915	1,280,000	55,800
Sept.	125.25	121.13	14	3,470	30	377	1,800	107,000	858,157	3,723,800	43,200
Oct.	124.42	120.97	23	2,740	2	314	920	56,500	646,332	2,852,270	24,600
Nov.	125.25	120.49	10	3,440	13	174	1,260	74,900	263,226	829,260	38,200
Dec.	123.60	121.95	† 8	2,090	24	878	1,770	109,000	220,689	625,260	46,100
Yearly	134.27	120.45		14,700		95.4	2,990	2,161,400	4,348,009	9,554,530	1,007,100

ᵘ Estimated * Partly estimated † And other days

RIO GRANDE BELOW ANZALDUAS DAM SITE

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights located .5 mile below the headworks of the Anzaldúas Canal and Anzaldúas Dam site, 11.7 river miles above the international highway bridge between Hidalgo, Texas and Reynosa, Tamaulipas, 1,073.1 river miles below the American Dam at El Paso, Texas, and 168.3 river miles from the Gulf of Mexico. The zero of the gage is 82.61 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 162 meter measurements during the year, 150 by the Mexican and 12 by the United States Section of this Commission, and a continuous record of gage heights. Records for a station at Hidalgo Bridge, 11.7 river miles downstream, may be found in previous water bulletins. Computations by shifting channel methods. Records available: January 1, 1952 through December 31, 1954.

REMARKS: Except for diversions, tributary inflows, and drainage returns below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 102.2 miles upstream, and especially by diversions into Anzaldúas Canal, .5 mile upstream. When the Rio Grande flow at the Hidalgo-Reynosa international highway bridge reaches about 60,000 second-feet or more, then a portion of the upstream river flow finds outlet to the Gulf of Mexico through flood channels which branch from the Rio Grande, in the United States, a short distance above this station and, in Mexico, within 118 miles below this station.

EXTREME FLOWS FROM RECORDS: (Last 3 years). Momentary: Max. 27,900 second-feet on September 6, 1953, at a gage height of 21.85 feet. Min. periods of no flow have occurred on several occasions at a gage height of 1.08 feet.

Average Flow in Second-Feet

Daily:	Max. 27,440	Sept. 6, 1953	Min. 0	Occasionally	
Monthly:	Max. 7,880	Sept. 1953	Min. 25.1	June	1953
Yearly:	Max. 1,840	1953	Min. 1,180		1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	36.0	2,800	1,660	2,120	650	3,880	992	1,200	653	667	491	1,350
2	42.4	2,570	2,020	2,470	1,990	3,530	533	1,210	720	273	561	1,260
3	51.9	2,310	1,990	2,310	1,860	3,600	929	1,160	766	206	646	1,260
4	61.8	2,230	2,200	2,190	1,810	3,640	388	1,080	1,010	1,000	689	1,230
5	69.2	1,860	2,310	3,220	2,300	3,640	205	1,040	1,200	2,270	727	1,370
6	69.6	2,000	1,660	3,920	2,520	3,640	206	1,130	1,260	2,210	855	1,350
7	69.9	2,440	1,340	2,900	2,400	3,510	218	1,270	1,340	470	876	1,390
8	75.9	2,000	1,310	2,400	2,260	3,570	438	1,520	1,320	399	879	1,430
9	78.4	1,500	1,370	2,480	2,210	3,810	830	1,760	1,300	210	858	1,520
10	80.5	1,830	1,530	12,850	1,890	3,880	911	1,910	1,360	252	879	1,520
11	93.2	1,990	2,060	6,960	1,680	3,670	936	1,810	1,340	188	597	1,580
12	93.9	1,530	1,840	441	1,800	3,920	922	1,620	1,370	157	133	1,670
13	90.1	1,920	1,860	106	2,340	4,170	911	1,520	1,350	152	238	1,630
14	71.0	2,290	2,020	38.5	1,820	4,170	901	1,370	1,030	144	333	1,530
15	65.0	2,420	2,110	19.4	1,500	4,130	915	1,530	946	140	558	1,450
16	88.3	2,310	1,950	14.1	1,610	4,170	939	1,900	515	180	745	1,470
17	167	2,650	2,090	9.5	2,240	4,200	759	1,920	423	554	766	1,210
18	240	2,220	2,230	8.1	2,550	4,240	530	1,770	621	692	1,160	986
19	438	2,250	1,980	12.0	3,520	4,130	597	1,340	1,190	706	1,230	1,320
20	1,180	2,410	1,800	6.7	4,380	4,240	872	1,030	1,070	710	1,170	1,360
21	2,150	1,980	745	.7	3,880	4,340	929	1,070	963	629	1,110	1,270
22	2,010	2,010	876	0	3,310	3,920	992	1,180	1,080	530	1,190	1,110
23	1,570	1,870	1,280	1.1	3,500	3,360	1,090	1,020	1,140	982	1,230	960
24	741	1,830	1,740	24.4	3,640	3,230	1,210	1,020	1,100	943	1,130	929
25	1,910	1,560	1,670	67.5	3,600	3,960	1,350	961	1,010	855	1,040	1,080
26	2,850	1,610	1,510	84.0	3,500	4,060	1,360	859	1,120	706	989	1,460
27	3,090	1,760	1,620	120	3,240	2,660	1,310	820	1,210	724	1,060	1,440
28	3,360	1,360	2,150	142	3,600	784	1,290	714	1,330	816	1,180	1,530
29	3,310		2,400	102	3,570	625	1,290	1,130	1,190	742	1,190	1,480
30	3,190		1,730	143	3,710	3,640	1,270	1,080	1,140	685	1,300	1,410
31	3,140		1,650		3,960		1,120	837		519		1,450
Sum	30,483.1	57,510	54,701	45,160.0	82,840	108,319	27,143	39,781	32,067	19,711	25,810	42,005

Month	Current Year 1954 Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1952-1954 Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	7.55	1.87	31	3,460	1	30.7	983	60,460	48,827	60,460	31,800
Feb.	6.99	3.81	1	2,990	28	812	2,050	114,100	59,017	114,100	23,290
Mar.	6.92	3.08	29	3,150	21	487	1,760	108,500	70,747	108,500	51,200
Apr.	14.27	1.05	10	14,730	†21	0	1,510	89,570	57,930	89,570	28,310
May	8.56	2.36	20	4,630	1	187	2,670	164,300	109,763	164,300	35,190
June	8.56	2.36	18	4,590	29	307	3,610	214,900	115,393	214,900	1,480
July	5.51	2.00	1	2,320	† 5	205	876	53,840	104,023	252,400	5,830
Aug.	5.22	2.95	10	2,200	28	660	1,280	78,910	122,987	241,200	48,850
Sept.	4.49	2.17	28	1,660	17	325	1,070	63,600	190,130	468,500	38,290
Oct.	6.23	1.38	5	2,900	15	137	636	39,100	139,927	359,200	21,480
Nov.	4.04	1.08	30	1,370	12	93.9	860	51,190	43,910	53,940	26,600
Dec.	4.63	3.22	12	1,700	24	879	1,360	83,320	40,430	83,320	1,900
Yearly	14.27	1.05		14,730		0	1,550	1,121,790	1,103,084	1,330,780	856,680

† And other days

RIO GRANDE FLOODWAY DISCHARGES
LOWER RIO GRANDE VALLEY

On the United States Side

During floods, water is diverted from the Rio Grande to the United States floodway system at the Mission Inlet and the Hackney Lake Inlet to the Main Floodway. These inlets are located, respectively, approximately 6 miles above and 5 miles below the gaging station at Anzaldúas Dam site, 11.7 river miles above the international highway bridge between Hidalgo, Texas and Reynosa, Tamaulipas. Flood water entering the Mission Inlet is measured at the North Floodway Station south of McAllen and flood water entering the Hackney Lake Inlet is measured at the South Floodway Station south of McAllen. These waters join at a point about 5 miles northeast of Hidalgo and flow eastward in the Main Floodway for about 19 miles to a point approximately 3 miles southwest of Mercedes. Here, the floodway divides, one channel going northeastward through the Arroyo Colorado Floodway to the Gulf of Mexico and the other going to the Gulf via the North Floodway, traveling first northward and then eastward. The Arroyo Colorado Floodway is measured at U.S. 83 Highway bridge near Harlingen, and the North Floodway flow is measured at U.S. 77 Highway bridge near Sebastian.

In 1954, there was no flow from the Rio Grande through these floodways.

On the Mexican Side

There are several regular floodways on the Mexican side which divert excess Rio Grande floodwater to the Gulf of Mexico. During 1954, no flow was diverted from the Rio Grande into these floodways, including the Retamal Canal.

DIVERSIONS FROM THE RIO GRANDE
RETAMAL CANAL NEAR RIO BRAVO, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with car, located .87 mile below headgate, which is about 1,000 feet from the Rio Grande. This canal has a capacity of 7,000 second-feet. It diverts from the Rio Grande at a point 1,108.8 river miles below the American Dam at El Paso, Texas, or 24 river miles below the Hidalgo-Reynosa bridge near Hidalgo, Texas, and 132.6 miles upstream from the Gulf of Mexico. The zero of the gage is .85 foot above mean sea level, U.S.C. & G.S. datum.

RECORDS: No water was diverted from the Rio Grande through Retamal Canal in 1954. Records available: September 1939 through December 1954.

REMARKS: Retamal Canal empties into Culebrón Reservoir, which in turn discharges into Villa Cárdenas Reservoir, from which a canal leads to Palito Blanco Reservoir. These reservoirs are used for irrigation purposes. During Rio Grande floods, floodwater may escape from Villa Cárdenas via Floodway No. 1 to the Gulf of Mexico. No use was made of this floodway during 1954. At a point 600 feet below Retamal Canal, headgate water may be conducted into the Retamal Canal from the Culebrón Lateral of the Anzaldúas Canal. In 1954, the amount of water which reached Culebrón Reservoir by this means is not known.

RETURN FLOWS AT PONIENTE DRAIN AND RETAMAL CANAL

Poniente Drain West of Reynosa, Tamaulipas

DESCRIPTION: This drain branches off the left side of the Anzaldúas Canal at a point 5.16 miles below the canal intake and enters the Rio Grande about 1,084.2 river miles below the American Dam at El Paso, Texas.

RECORDS: The drain flows reported here were determined by subtracting, from the flows at the gaging station near the head of the Anzaldúas Canal, the flows passing the Monterrey Bridge, .5 mile below this drain. The flows at the Monterrey Bridge were calculated by a rating curve previously established by using measurements at the gaging station and gage heights at the bridge. Records available: September 1, 1953 through December 1954.

REMARKS: Water diverted from the river into the Anzaldúas Canal can be returned to the Rio Grande through this drain. All water returned through this drain in 1954 is reported below. Returns were made through this drain to facilitate construction and repair work on a low earth and rock dam in the Rio Grande just below Anzaldúas Canal headgates.

EXTREME FLOWS FROM RECORDS: Momentary: Max. Ø 3,810 second-feet, which occurred January 18, 1954. Min. no flow the greater part of the time.

Average Flow in Second-Feet

Daily:	Max. 3,810	Jan. 18, 1954	Min. 0		Frequently
Monthly:	Max. 1,420	Jan. 1954	Min. 0		Frequently
Yearly:	Max. 167	1953	Min. 131		1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	738	0	0	0	614	0	0	0	0	0	0	0
2	752	0	0	0	0	0	0	0	0	0	0	0
3	893	0	0	0	0	0	0	0	0	0	0	0
4	996	0	0	0	0	0	0	0	0	0	0	0
5	1,150	0	0	0	0	0	0	0	0	0	0	0
6	1,200	0	0	0	0	0	0	0	0	0	0	0
7	1,470	0	0	0	0	0	0	0	0	0	0	0
8	1,780	0	0	0	0	0	0	0	0	0	0	0
9	1,870	0	0	0	0	0	0	0	0	0	0	0
10	2,060	0	0	0	0	0	0	0	0	0	0	0
11	2,430	0	0	0	0	0	0	0	0	0	0	0
12	2,450	0	0	0	0	0	0	0	0	0	0	0
13	2,280	0	0	0	0	0	0	0	0	0	0	0
14	2,190	0	0	0	0	0	0	0	0	0	0	0
15	2,380	0	0	0	0	0	0	0	0	0	0	0
16	2,650	0	0	0	0	0	0	0	0	0	0	0
17	3,260	0	0	0	0	0	0	0	0	0	0	0
18	3,810	0	0	0	0	0	0	0	0	0	0	0
19	3,670	0	0	0	0	0	0	0	0	0	0	0
20	2,730	0	0	0	0	0	0	0	0	0	0	0
21	1,420	0	0	0	0	0	0	0	0	0	0	0
22	1,770	0	0	0	0	0	0	0	0	0	0	0
23	17.7	0	0	0	0	0	0	0	0	0	0	0
24	17.7	0	0	0	0	0	0	0	0	0	0	0
25	17.7	0	0	0	0	0	0	0	0	0	0	0
26	17.7	0	0	0	0	0	0	0	0	0	0	0
27	35.3	0	0	0	0	0	0	0	0	0	0	0
28	35.3	0	0	604	0	0	0	0	0	0	0	0
29	35.3		0	1,140	0	0	0	0	0	0	0	0
30	35.3		0	1,150	0	0	0	0		0		0
31	0		0		0		0	0		0		
Sum	44,161.0	0	0	2,894	614	0	0	0	0	0	0	0

Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1953-1954 Acre-Feet		
			High		Low						
	High	Low	Day	Ø	Day	Ø			Average	Maximum	Minimum
	Current Year 1954										
Jan.			18	3,810	31	0	1,420	87,590	43,795	87,590	0
Feb.				0		0	0	0	0	0	0
Mar.				0		0	0	0	0	0	0
Apr.			30	1,150	† 1	0	96.5	5,740	2,870	5,740	0
May			1	614	† 2	0	19.8	1,220	610	1,220	0
June				0		0	0	0	0	0	0
July				0		0	0	0	0	0	0
Aug.				0		0	0	0	365	730	0
Sept.				0		0	0	0	13,825	27,650	0
Oct.				0		0	0	0	10,645	21,290	0
Nov.				0		0	0	0	35,640	71,280	0
Dec.											
Yearly				3,810		0	131	94,550	107,750	120,950	94,550

† And other days Ø Mean daily

Retamal Canal near Río Bravo, Tamaulipas

There was no water returned to the Rio Grande through the Retamal Canal during 1954.

RIO GRANDE AT PROGRESO BRIDGE, TEXAS

DESCRIPTION: Water-stage recorder on the downstream side of the center pier of the bridge, 2 miles south of Progreso, Texas, .8 mile below Progreso pumping plant, 1,117.5 river miles below the American Dam at El Paso, Texas, and 123.9 river miles above the Gulf of Mexico. The zero of the gage was changed on January 1, 1954 from mean sea level to 52.56 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 50 meter measurements from the bridge, 47 by the Mexican and 3 by the United States Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: December 1, 1952 through August 24, 1953 and December 1, 1953 through December 31, 1954.

REMARKS: Except for diversions, tributary inflows, and drainage returns below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 147 miles upstream. When the Rio Grande flow at the Hidalgo-Reynosa international highway bridge reaches about 60,000 second-feet or more, then a portion of the upstream river flow finds outlet to the Gulf of Mexico through flood channels which branch from the Rio Grande in both countries within the reach, 44.4 miles upstream and 120.6 miles downstream from this station.

EXTREME FLOWS FROM RECORDS: (Last 3 years). Momentary: Max. 10,810 second-feet on April 11, 1954, with a gage height of 14.50 feet. Min. no flow several days in June, July, and August 1953.

Average Flow in Second-Feet

Daily:	Max.	* 9,960	Apr. 11, 1954	Min.	0	Frequently 1953
Monthly:	Max.	2,580	June 1954	Min.	5.1	June 1953
Yearly:	Max.	1,270	1954	Min.	No Record	

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	501	2,310	1,090	1,070	978	2,740	2,400	780	533	862	565	897
2	522	2,090	1,170	1,290	883	2,550	1,140	911	498	696	396	1,010
3	614	1,820	1,380	1,600	1,340	2,330	713	759	441	318	374	915
4	707	1,630	1,320	1,580	1,380	2,350	869	674	306	350	399	936
5	680	1,590	1,680	1,570	1,400	2,440	685	625	473	996	523	986
6	838	1,320	1,970	2,280	1,760	2,510	466	597	749	2,470	586	1,180
7	894	1,480	1,460	2,590	1,990	2,520	388	639	883	2,590	696	964
8	1,030	1,760	1,150	2,030	1,790	2,390	307	808	876	1,380	777	901
9	1,330	1,390	1,010	1,790	1,540	2,380	294	1,110	894	964	618	996
10	1,690	1,020	992	*5,010	1,600	2,540	660	1,050	908	699	629	1,120
11	1,820	1,200	1,130	*9,960	1,360	2,590	809	1,140	901	597	936	1,260
12	1,880	1,240	1,420	*5,370	1,220	2,520	823	1,090	1,070	516	788	1,380
13	1,920	1,010	1,260	*1,610	1,250	2,650	710	992	1,200	427	292	1,470
14	1,810	1,330	1,320	* 731	1,530	2,800	681	925	1,170	350	216	1,370
15	1,700	1,560	1,610	* 463	1,240	2,780	710	964	939	307	264	1,150
16	1,840	1,660	1,520	262	946	2,740	689	1,190	858	274	313	950
17	2,210	1,680	1,380	172	1,010	2,750	685	1,320	586	229	473	1,000
18	2,760	1,880	1,520	145	1,300	2,780	561	1,360	441	516	614	837
19	3,160	1,570	1,540	131	1,630	2,820	477	1,280	565	794	918	745
20	3,210	1,650	1,330	114	2,450	2,960	417	988	971	710	1,010	1,020
21	3,130	1,720	1,200	102	2,970	3,010	459	819	915	643	978	950
22	3,740	1,510	562	87.9	2,640	3,050	565	837	795	632	1,030	759
23	3,160	1,440	576	76.3	2,410	2,720	572	921	858	516	876	618
24	1,670	1,360	855	60.0	2,700	2,370	706	755	925	946	855	590
25	925	1,310	1,130	49.8	2,530	2,740	851	695	897	1,200	869	827
26	1,430	1,090	1,090	40.6	2,450	3,520	1,050	681	862	1,030	908	982
27	2,080	1,080	985	85.5	2,340	3,570	915	589	954	798	735	1,220
28	2,320	1,250	1,140	57.2	2,260	2,300	816	533	954	738	837	1,020
29	2,500		1,610	311	2,310	1,060	791	540	989	752	1,050	1,050
30	2,480		1,560	897	2,490	982	784	833	862	632	858	1,190
31	2,380		1,120		2,790		837	731		618		1,170
Sum	56,931	41,950	39,080	*41,535.3	56,487	77,462	22,830	27,136	24,273	24,550	20,383	31,463

Current Year 1954 — Period # Dec. 1952-1954

Month	Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Acre-Feet Average	Acre-Feet Maximum	Acre-Feet Minimum
Jan.	8.73	2.99	22	3,850	1	466	1,840	112,920	66,860	112,920	20,800
Feb.	6.53	3.87	1	2,390	13	975	1,500	83,210	48,655	83,210	14,100
Mar.	6.00	1.80	6	2,040	22	321	1,260	77,520	53,760	77,520	30,000
Apr.	14.50	1.64	11	10,810	28	18.4	*1,380	* 82,390	* 59,645	* 82,390	* 36,900
May	8.04	3.77	21	3,040	2	784	1,820	112,000	66,300	112,000	20,600
June	8.86	3.38	27	3,640	30	675	2,580	153,600	76,952	153,600	305
July	7.48	2.49	1	2,670	9	268	736	45,280	23,295	45,280	1,310
Aug.	5.02	2.59	17	1,420	29	494	875	53,820			
Sept.	4.43	2.10	13	1,240	4	293	809	48,150			
Oct.	7.35	1.71	7	2,950	4	180	792	48,690			
Nov.	3.81	1.64	29	1,070	†14	212	679	40,430	49,437	65,900	20,000
Dec.	4.76	2.92	13	1,500	24	547	1,010	62,410			
Yearly	14.50	1.64		10,810		18.4	1,270	920,420			

* Partly estimated † And other days # Some months missing

RIO GRANDE NEAR SAN BENITO, TEXAS

DESCRIPTION: Temporary water-stage recorder, operated during periods of low and medium flow, located on the United States side, 5.4 miles below San Benito pumping plant, 1,142.5 river miles below the American Dam at El Paso, Texas and 98.9 river miles above the Gulf of Mexico. The zero of the gage is mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 47 measurements during the year, by wading during low flow, by boat during medium flow, and a continuous record of gage heights. Computations by shifting channel methods. Records available: November 26, 1952 through August 25, 1953 and December 1953 through December 1954.

REMARKS: Except for diversions, tributary inflows, and drainage returns below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 172 miles upstream. When the Rio Grande flow at the Hidalgo-Reynosa international bridge reaches about 60,000 second-feet or more, then a portion of the upstream river flow finds outlet to the Gulf of Mexico through flood channels, which branch from the Rio Grande in both countries within the reach, 69.4 miles upstream and 95.6 miles downstream from this station.

EXTREME FLOWS FROM RECORDS: (Last three years.) Momentary: Max. not recorded. Min. no flow occurs frequently.

Average Flow in Second-Feet

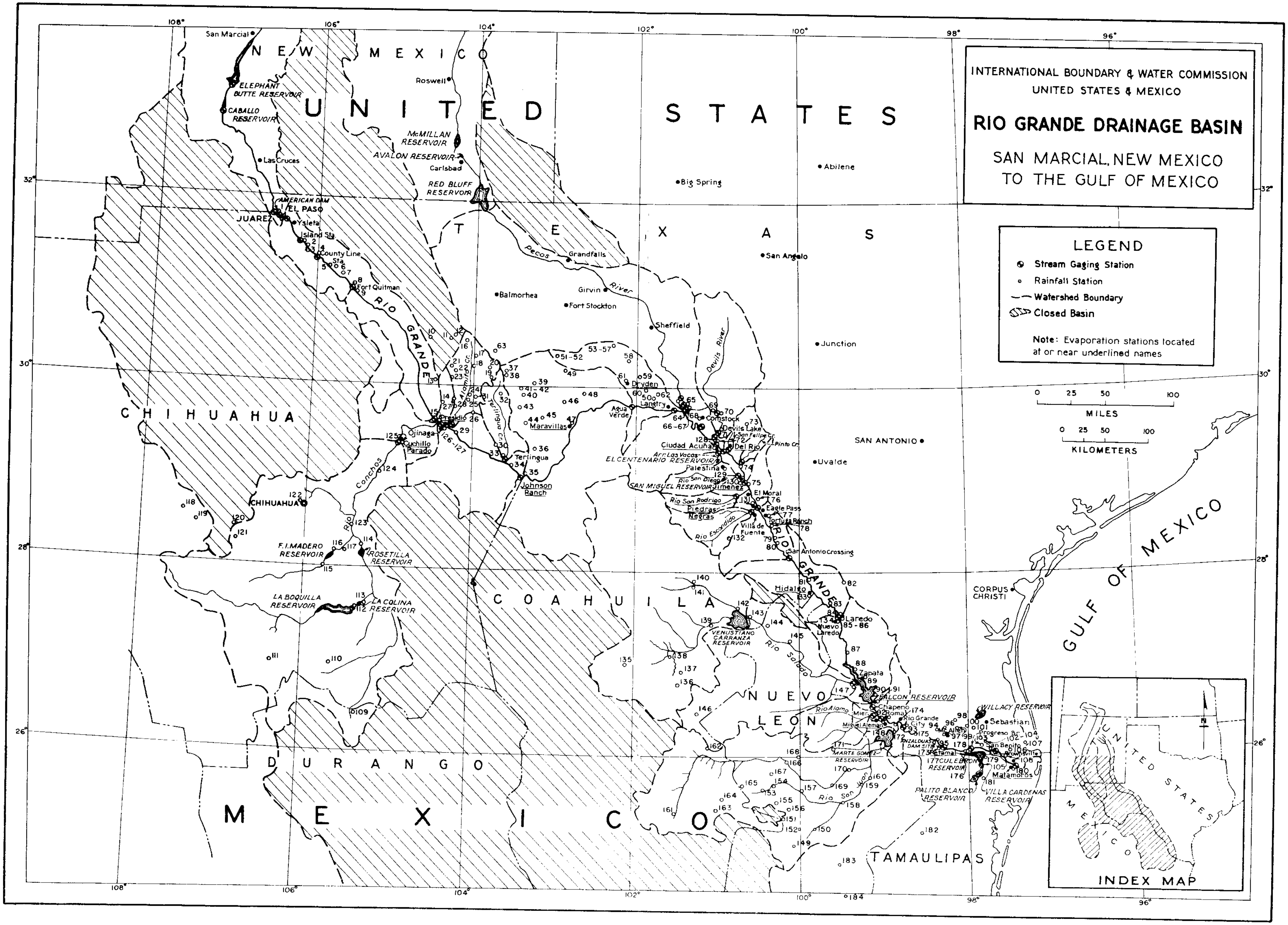
Daily:	Max.	Not recorded		Min.	0	Frequently
Monthly:	Max.	1,040	June 1954	Min.	.6	1953
Yearly:	Max.	426	1954	Min.	426	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.6	707	164	14.7	250	787	1,450	224	241	468	231	45.7
2	6.0	697	39.3	9.6	150	643	1,330	216	82.3	530	85.6	98.5
3	9.7	556	159	144	126	441	490	233	33.0	313	48.8	128
4	8.6	286	155	279	546	417	630	53.9	17.9	308	13.1	55.3
5	52.7	321	180	152	832	421	724	26.8	19.0	432	8.1	250
6	96.5	240	683	297	655	491	400	14.8	115	1,410	13.1	136
7	179	211	651	667	609	534	225	20.7	232	2,050	36.9	149
8	122	362	425	541	465	436	138	24.4	334	1,600	106	182
9	183	363	107	374	327	381	112	204	416	1,170	52.1	259
10	962	97.7	86.2	u1,530	326	465	253	337	297	880	21.1	320
11	362	117	88.0	u7,180	438	584	331	237	314	556	350	478
12	169	152	174	u6,270	351	654	372	295	357	448	537	804
13	256	131	353	u3,150	363	616	362	190	529	285	205	848
14	268	59.7	302	u1,080	353	767	329	165	504	99.7	102	723
15	403	328	480	396	449	844	323	151	355	40.4	23.0	598
16	430	655	570	230	255	816	325	263	76.8	94.3	0	406
17	548	595	567	130	179	766	194	378	66.1	133	0	302
18	742	719	507	77.0	343	806	147	536	18.2	127	20.6	378
19	788	690	597	36.0	462	985	119	482	67.6	145	41.3	318
20	769	581	356	42.9	641	1,400	92.9	378	183	289	72.0	219
21	858	861	262	38.2	1,030	1,660	41.3	365	298	292	209	244
22	1,330	728	146	50.5	795	1,470	96.1	346	227	149	144	79.2
23	1,500	285	27.0	25.8	608	1,300	136	473	329	144	102	54.0
24	959	208	13.7	19.5	680	953	62.5	470	218	263	50.4	60.6
25	302	285	95.1	19.0	864	1,180	166	367	175	248	28.5	213
26	46.0	278	149	16.3	727	2,310	299	402	354	367	66.1	432
27	407	204	30.6	14.2	652	3,410	328	362	374	160	41.7	327
28	546	137	17.3	10.0	515	3,190	235	158	425	199	121	229
29	655		131	8.7	516	1,760	174	199	475	298	110	176
30	617		306	66.9	589	810	187	283	408	260	56.4	303
31	754		131		762		225	497		373		333
Sum	10,854.4		u22,869.3		31,297		8,351.6		14,131.4		9,148.3	
	14,335.1		7,952.2		15,858		10,296.8		7,540.9		2,895.8	

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	Extreme Second-Feet High	Extreme Second-Feet Low Day	Extreme Second-Feet Low	Average Second-Feet	Total Acre-Feet	Period # Dec. 1952-1954 Acre-Feet Average	Maximum	Minimum
Jan.	40.21	34.05	22	1,580	2	6.0	462	28,400	17,330	28,400	6,260
Feb.	38.12	34.08	21	914	14	10.0	388	21,500	14,005	21,500	6,510
Mar.	37.64	33.75	6	765	28	7.9	257	15,800	13,900	15,800	12,000
Apr.	50.15	33.75			1	7.9	u 762	u 45,400	u 29,750	u 45,400	14,100
May	38.72	34.25	21	1,140	3	30.4	512	31,500	19,635	31,500	7,770
June	44.51	35.75	27	3,590	9	353	1,040	62,100	31,077	62,100	53.8
July	40.45	33.79	1	1,830	21	28.6	332	20,400	10,217	20,400	34.9
Aug.	36.60	33.60	18	564	7	11.6	269	16,600			
Sept.	36.49		14	568	5	0	251	15,000			
Oct.	40.78	33.80	7	2,140	15	35.1	456	28,000			
Nov.	36.60		12	589	†16	0	96.5	5,740			
Dec.	37.53	33.45	13	918	4	17.5	295	18,100	17,117	28,300	4,950
Yearly	50.15					0	426	308,540			

u Estimated † And other days # Some months missing


INTERNATIONAL BOUNDARY & WATER COMMISSION
UNITED STATES & MEXICO
RIO GRANDE DRAINAGE BASIN
SAN MARCIAL, NEW MEXICO
TO THE GULF OF MEXICO
LEGEND
Stream Gaging Station
Rainfall Station
Watershed Boundary
Closed Basin
Note: Evaporation stations located at or near underlined names
0 25 50 100
MILES
0 25 50 100
KILOMETERS
UNITED STATES
NEW MEXICO
TEXAS
MEXICO
CHIHUAHUA
COAHUILA
NUEVO LEON
DURANGO
TAMAULIPAS
GULF OF MEXICO
RIO GRANDE
San Marcial
ELEPHANT BUTTE RESERVOIR
CABALLO RESERVOIR
Las Cruces
McMILLAN RESERVOIR
AVALON RESERVOIR
Carlsbad
RED BLUFF RESERVOIR
Roswell
Big Spring
Abilene
San Angelo
Junction
SAN ANTONIO
Uvalde
CORPUS CHRISTI
AMERICAN DAM
EL PASO
JUAREZ
Ysleta
Island Sta.
County Line Sta.
Fort Quitman
Pecos River
Grandfalls
Girvin
Fort Stockton
Balmorhea
Sheffield
Devils River
Dryden
Langtry
Agua Verde
Maravillas
Presidio
Ojinaga
Cuchillo Parado
Terlingua
Johnson Ranch
Comstock
Devils Lake
Del Rio
Ciudad Acuña
EL CENTENARIO RESERVOIR
Palestina
SAN MIGUEL RESERVOIR
Jimenez
Piedras Negras
El Moral
Eagle Pass
Tortuga Ranch
Villa de Fuente
San Antonio Crossing
Hidalgo
Laredo
Nuevo Laredo
Zapata
FALCON RESERVOIR
Chapeño
Mier
Roma
Miguel Aleman
Rio Grande City
VENUSTIANO CARRANZA RESERVOIR
Rio Salado
Rio Alamo
MARTE GOMEZ RESERVOIR
Rio San Juan
ANZALDUAS DAM SITE
Retamal
CULEBRON RESERVOIR
PALITO BLANCO RESERVOIR
VILLA CARDENAS RESERVOIR
WILLACY RESERVOIR
Sebastian
Progreso
San Benito
Brownsville
Matamoros
Conchos
CHIHUAHUA
F.I. MADERO RESERVOIR
ROSETILLA RESERVOIR
LA BOQUILLA RESERVOIR
LA COLINA RESERVOIR
INDEX MAP

RIO GRANDE AT MATAMOROS, TAMAULIPAS

DESCRIPTION: Water-stage recorder with sit-down cable car and winch. The recorder was attached to the left pier on the downstream side of the railroad bridge between Matamoros, Tamaulipas and Brownsville, Texas, 57.6 miles upstream from the Gulf of Mexico, and 1,183.8 river miles below the American Dam at El Paso, Texas. The cable was located .3 mile upstream from the bridge. The zero of the gage was 12.11 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 46 meter measurements during the year and a continuous record of gage heights. The river bottom shifted greatly at this station. Computations by shifting channel methods. Records available: 1801 to 1913 and 1923 to July 16, 1954.

REMARKS: Except for diversions, tributary inflows, and drainage returns below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 212.9 river miles upstream. Operation of this station was suspended on July 17, 1954.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow since 1900 was 36,320 second-feet on June 22, 1903. The greatest flow since 1923 was 32,950 second-feet, which occurred April 30, 1949, with a gage height of 24.89 feet on the present gage. There was no flow at this station on a few occasions in March and April 1930, January and February 1951, February through May 1952, June through October 1953, and March 26, 1954.

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12.4	327	35.0	28.3	39.6	276	971					
2	11.3	290	30.0	30.4	86.5	293	1,260					
3	9.9	272	25.1	28.3	70.7	194	826					
4	8.8	201	31.1	28.3	37.1	88.3	325					
5	8.1	89.0	37.4	28.3	171	42.4	480					
6	7.4	59.7	37.4	26.5	327	39.6	636					
7	11.7	30.4	216	26.5	222	61.8	278					
8	15.9	ᵘ 26.5	237	121	189	133	185					
9	15.9	ᵘ 28.3	42.0	142	118	61.8	88.3					
10	31.8	85.5	42.0	138	109	39.6	50.5					
11	396	11.3	11.3	2,760	74.2	39.6	50.5					
12	148	11.3	11.3	6,000	170	50.5	134					
13	19.8	12.7	11.3	4,240	138	161	235					
14	21.9	14.5	45.9	2,120	88.3	134	221					
15	23.7	15.9	44.1	904	74.2	228	207					
16	23.7	30.7	97.5	406	124	281	200					
17	45.6	325	150	301	50.5	274						
18	163	227	234	138	39.6	249						
19	275	290	243	81.2	42.4	319						
20	360	333	194	50.5	104	710						
21	374	294	116	50.5	218	1,050						
22	653	512	38.1	50.5	466	1,190						
23	1,020	364	24.0	50.5	319	1,120						
24	1,040	62.9	9.5	50.5	208	978						
25	470	46.6	4.9	50.5	215	989						
26	148	30.4	0	45.9	345	1,360						
27	23.7	31.8	3.5	42.4	244	2,270						
28	79.8	33.5	7.1	42.4	194	2,990						
29	182		10.6	42.4	154	2,590						
30	230		ᵘ 5.3	42.4	127	1,680						
31	259		ᵘ 5.3		148							
Sum	4,056.0			18,066.3		19,892.6						
	6,089.4		1,999.7		4,913.1							

Total discharge for period July 1 through December 31, estimated as 57,210 second-foot days, based on Lower Brownsville and intervening diversions.

Month	Current Year 1954 — Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Period 1924-1954 — Acre-Feet		
			High		Low						
	High	Low	Day		Day				Average	Maximum	Minimum
Jan.	5.22		23	1,230	6	Ø 7.4	196	12,080	169,568	490,800	842
Feb.	4.00		22	562	†24	Øᵘ 10.6	145	8,050	122,109	328,300	1,160
Mar.	3.61		† 7	385	26	0	64.5	3,970	101,552	313,600	748
Apr.	13.12	1.74	12	6,290	† 6	Ø 26.5	602	35,830	100,691	425,800	627
May	3.94	1.90	22	494	3	37.1	158	9,750	241,357	721,000	935
June	9.06	1.90	28	3,090	11	37.1	663	39,460	309,178	1,180,500	20.3
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											
Yearly								** 222,640	2,943,366		

ᵘ Estimated † And other days Ø Mean daily ** Includes an estimated 113,500 acre-feet for the period July through December

RIO GRANDE AT LOWER BROWNSVILLE, TEXAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car equipped for winch and heavy weights, located 1,000 feet below the El Jardin pumping plant, 6.6 river miles below Brownsville, Texas and Matamoros, Tamaulipas, 50.4 river miles upstream from the Gulf of Mexico, and 1,191.0 river miles below the American Dam at El Paso, Texas. The zero of the gage is at mean sea level, U.S.C. & G.S. datum. An auxiliary water-stage recorder, located 300 feet downstream from this station, was used during periods of low flow.

RECORDS: Based on 53 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: January 1934 through December 1954.

REMARKS: Except for diversions, tributary inflows, and drainage returns below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 220 miles upstream. During floods, when flow at the Hidalgo-Reynosa international highway bridge reaches approximately 60,000 second-feet, a portion of the upstream river flow finds outlet to the Gulf of Mexico through flood channels in both countries within 124.6 miles above this station.

EXTREME FLOWS FROM RECORDS: The greatest recorded flow since January 1934 was 31,700 second-feet, which occurred on October 8, 1945, with a gage height of 31.48 feet. Zero flow occurs frequently.

Average Flow in Second-Feet

Daily:	Max.	30,800	Sept. 14, 1942; Oct. 8, 1945	Min.	0	Frequently
Monthly:	Max.	* 23,200	Oct. 1941	Min.	0	June & July 1953
Yearly:	Max.	9,010	1941	Min.	214	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	ᵛ 5.0	243	12.0	0	0	191	1,130	22.9	104	388	324	13.9
2	ᵛ 5.0	235	3.3	0	0	253	1,280	74.7	114	351	321	4.7
3	ᵛ 5.0	193	10.4	0	0	165	1,070	39.9	37.6	429	176	2.8
4	ᵛ 5.0	159	11.9	0	.2	37.6	461	36.9	0	564	66.9	7.9
5	8.2	41.2	4.0	0	31.8	1.6	460	9.7	.4	548	38.5	24.6
6	9.8	8.0	16.2	0	218	1.0	774	5.1	0	546	42.5	29.8
7	7.4	4.6	118	0	164	8.5	362	6.0	0	1,370	35.7	66.6
8	5.0	.8	203	12.6	98.0	49.5	192	0	35.5	1,930	26.3	33.3
9	11.3	4.0	62.7	66.8	30.6	10.0	98.3	0	90.7	1,760	23.4	25.7
10	1.7	83.9	0	62.9	19.0	.8	54.1	.2	156	1,370	68.8	103
11	164	22.3	0	1,400	3.0	.4	42.7	125	125	1,040	126	171
12	55.8	0	.1	5,610	61.1	.7	137	58.4	114	750	166	207
13	0	0	0	4,600	46.4	33.0	237	87.1	159	588	485	340
14	0	6.6	1.1	2,540	5.0	18.1	229	62.4	349	452	342	552
15	0	12.9	0	1,040	12.0	75.7	223	30.6	388	275	162	511
16	11.1	1.3	0	334	27.7	161	210	16.2	265	88.4	51.0	411
17	.2	160	54.3	220	6.2	153	184	42.7	71.6	11.5	18.4	258
18	38.3	165	117	119	0	124	125	74.9	7.5	6.7	9.7	151
19	112	178	191	25.9	.5	160	69.0	115	9.2	3.2	10.8	124
20	182	306	168	0	22.6	492	14.0	130	1.8	.2	28.2	125
21	185	239	62.1	0	40.6	883	.3	55.3	7.2	50.7	44.4	52.8
22	266	417	.1	0	310	1,150	0	135	29.0	141	77.8	22.0
23	548	405	0	0	277	1,150	0	188	11.7	147	101	26.6
24	734	110	0	0	129	1,060	1.8	202	0	64.2	48.4	.2
25	515	24.6	0	0	98.0	1,050	4.4	250	0	78.5	21.9	0
26	200	5.4	0	0	249	1,410	.6	179	0	194	21.1	.6
27	24.7	20.2	0	0	194	2,160	40.9	136	0	337	1.0	102
28	33.0	20.2	0	0	118	2,910	121	233	0	238	18.9	69.9
29	128		0	0	62.6	2,720	126	186	97.6	186	20.8	29.2
30	182		0	0	18.0	2,010	70.5	70.7	196	219	19.7	5.2
31	209		0		54.0		16.3	76.6		175		1.2
Sum	3,651.5	3,066.0	1,035.2	16,031.2	2,296.3	18,438.9	7,733.9	2,649.3	2,369.8	14,301.4	2,897.2	3,472.0

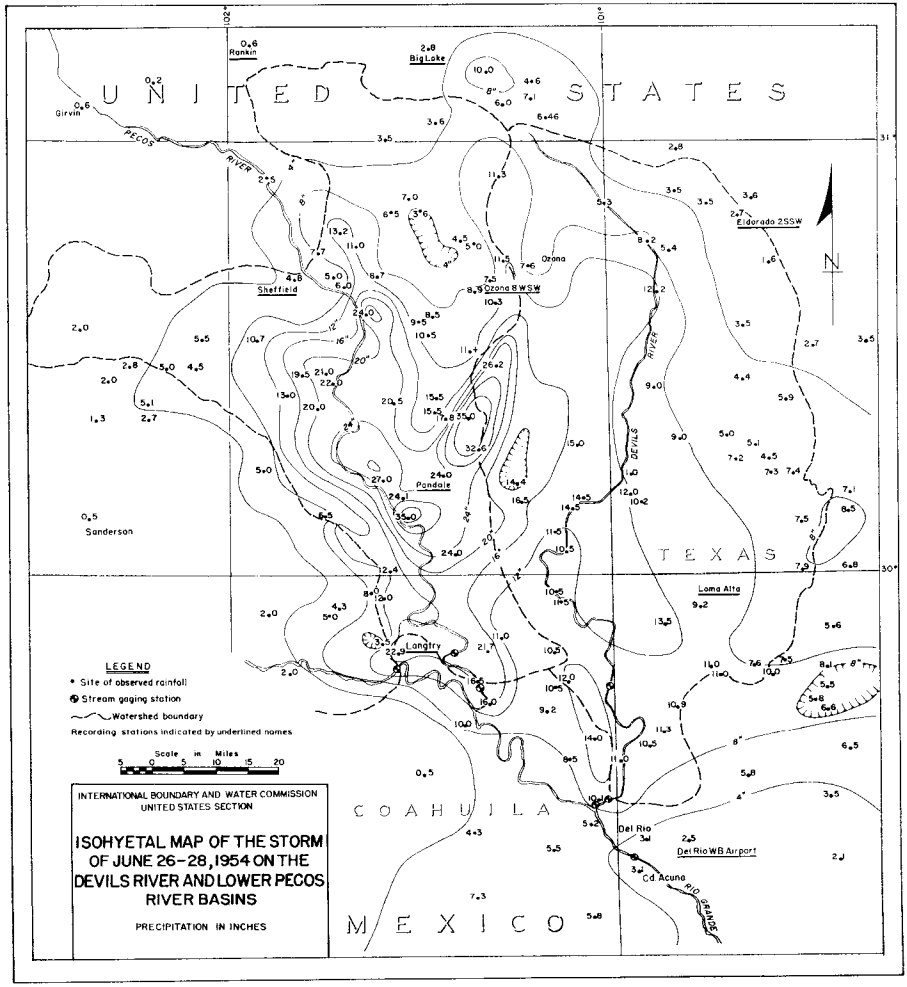
Current Year 1954									Period 1934-1954		
Month	Extreme Gage Feet		Extreme Second-Feet				Average Second-Feet	Total Acre-Feet	Acre-Feet		
			High		Low				Average	Maximum	Minimum
	High	Low	Day		Day						
Jan.	12.58		24	770	† 9	0	118	7,240	126,737	299,000	ᵛ 55.9
Feb.	10.93		22	467	†12	0	110	6,080	94,145	237,000	137
Mar.	9.89		19	249	† 4	0	33.4	2,050	84,940	311,000	40.5
Apr.	20.76		12	6,070	† 1	0	534	31,800	79,946	* 372,000	221
May	10.49		22	375	† 1	0	74.1	4,550	213,155	717,000	53.6
June	16.61	7.33	28	3,000	11	.3	615	36,600	260,104	*1,161,000	0
July	13.50		1	1,500	†21	0	249	15,300	230,854	759,000	0
Aug.	9.52		24	299	† 5	0	85.5	5,250	189,985	679,000	5,250
Sept.	10.05		15	404	† 3	0	79.0	4,700	448,332	1,337,000	981
Oct.	14.37		8	1,980	†18	0	461	28,400	* 396,430	*1,427,000	850
Nov.	10.33		13	531	†17	0	96.6	5,750	145,396	614,000	1,070
Dec.	10.53		14	580	† 1	0	112	6,890	112,707	341,000	337
Yearly	20.76			6,070		0	214	154,610	2,382,731	* 6,526,000	154,610

ᵛ Estimated * Partly estimated † And other days

FLOOD OF 1954

It is now well established that on the 300 river mile reach of the Rio Grande, from Sycamore Creek (48.5 miles above Eagle Pass, Texas) to the Río San Juan (4.4 miles above Rio Grande City), the greatest flood of which there is any written or traditional record since some time prior to 1746 (when the first permanent settlements were established along this reach of the river) occurred in June 1865.

The second greatest Rio Grande flood in this reach occurred in 1954. The record-breaking rainfall causing this flood is said by the U.S. Weather Bureau to have been associated with "Hurricane Alice," which crossed the coast from the Gulf of Mexico, 90 miles south of Brownsville, on June 24-25, 1954. The heaviest rainfall was on the Pecos River below Sheffield and on its tributary, Howards Creek, also on Johnson Draw, a tributary to the Devils River, where a large part of the town of Ozona was badly flooded and several persons were drowned. Rainfalls up to 34 inches were observed for the storm at two centers, 22 miles and 40 miles northward from Langtry. Shown below is an isohyetal map of the central part of the storm which is based on a map prepared by the Hydrometeorological Section of the U.S. Weather Bureau.



FLOOD OF 1954

Two major flood peaks were observed on the Pecos at the gaging station near Comstock, Texas, 5.5 miles above the confluence with the Rio Grande. The first occurred at 7:30 A.M. on June 27 and the second at 1:30 A.M. on June 28. The gage heights of these peaks were 82.00 and 96.24 feet, respectively. (The zero of the gage is practically at river bed level.) The discharges at these peaks were 695,000 and 948,000 second-feet, respectively. According to tradition and all available records, this is the greatest flood to have entered the Rio Grande from the Pecos River.

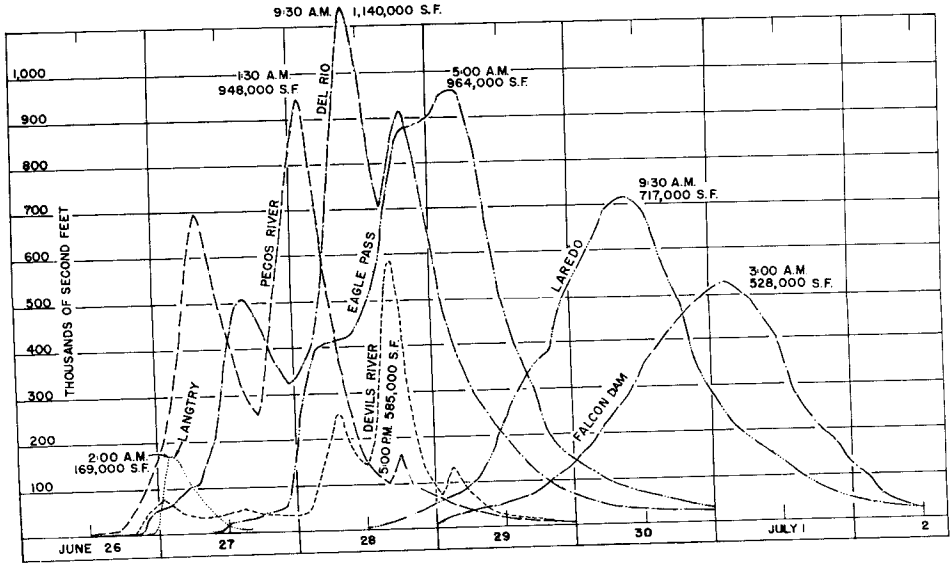
One high flood peak was observed on the Devils River at the gaging station near Del Rio, Texas, 4.5 miles above the confluence with the Rio Grande at 5:00 P.M. on June 28. The gage height of this peak was 34.76 feet and the peak discharge was 585,000 second-feet.

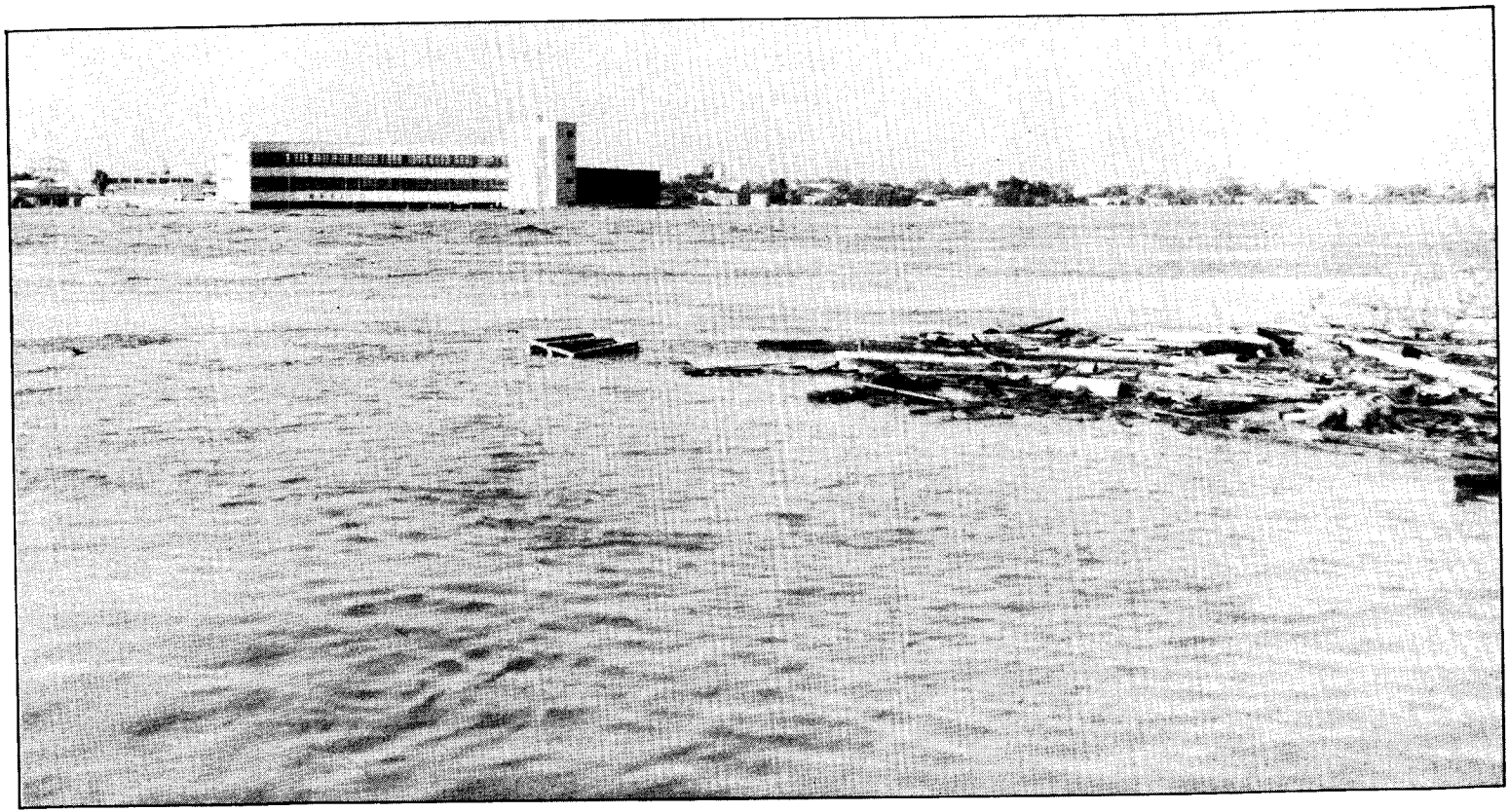
On the United States side, from Lozier Creek (21 miles upstream from Langtry) to Devils River, a great amount of water debouched into the Rio Grande. At the Langtry gaging station on the Rio Grande (24.1 miles above the mouth of the Pecos), a flood peak of 169,000 second-feet passed at 2:00 A.M. on June 27, with a gage height of 49.87 feet. There was no appreciable contribution to the flood flow below the Devils River. The entire flood flow was stopped by the Falcón Dam and a total of 1,850,000 acre-feet of water entered the reservoir.

The Pecos River watershed, from Sheffield gaging station to the gaging station near Comstock, contains 3,504 square miles. The U.S. Geological Survey reported that this storm caused a flood peak of about 17,000 second-feet on the Pecos at the Sheffield station during the night of June 27-28, which came from only a short distance upstream. Of the 948,000 second-foot peak near Comstock, it is estimated that 940,000 second-feet was contributed by the 3,504 square miles of watershed between this point and Sheffield. The resultant maximum rate of runoff of 268.26 second-feet per square mile is probably the greatest rate of runoff for a watershed of this size in the United States.

Many lives were lost in this flood, particularly at Piedras Negras, Mexico opposite Eagle Pass, Texas. At several places in this vicinity, the river width at the flood peak exceeded 3 miles.

The hydrographs below are for main river and tributary gaging stations where the flood occurred. The Falcón Dam graph was composed by adding hourly increments of reservoir storage and outflow.





VIEW OF THE FLOOD AT NUEVO LAREDO, TAMAULIPAS AS SEEN FROM THE UNITED STATES SIDE AT 9:00 A.M., JUNE 30, 1954, ABOUT THE TIME OF THE CREST.

OUTFALLS FROM WELLS AND SEWERS INTO THE RIO GRANDE

In Acre-Feet

EL PASO ELECTRIC COMPANY SANTA FE STREET PLANT COOLING WATER WASTE

This outfall enters the Rio Grande 3.3 miles below the American Dam. The 1954 record of outfall was obtained from records of water pumped from the company's wells and use of such water by the City of El Paso.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
1954	.3	1.4	24.5	3.5	5.0	80.8	114.0	61.0	66.4	10.9	0	0	367.8
* Average	49.7	46.6	66.9	44.6	81.4	84.8	76.6	61.5	42.8	45.8	33.1	38.3	672.1

EL PASO SEWAGE OUTFALL

This sewage outfall enters the Rio Grande 6.6 river miles below the American Dam. The 1954 record of outfall consists of flows measured by a Parshall meter and estimates by the Department of Water and Sewerage of the City of El Paso, of amounts which by-passed the meter, minus estimated diversions between the Sewage Plant and the Rio Grande for irrigation use on 60 acres of land.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
1954	1,059	1,007	1,132	1,093	1,204	1,241	1,326	1,320	1,280	1,246	1,166	1,142	14,216
Ø Average	770	724	782	760	820	870	937	924	874	884	824	811	9,980

EL PASO COUNTY WATER CONTROL AND IMPROVEMENT DISTRICT NO. 1 SEWAGE OUTFALLS

This water enters the Rio Grande through the sewer system of the El Paso County Water Control and Improvement District No. 1 between Ascarate and Ysleta, Texas, 9 and 15 miles, respectively, below the American Dam. The tabulation includes the outfalls from Disposal Plant No. 1 at Ascarate, Texas and Disposal Plant No. 2, a few miles downstream. Records furnished by the El Paso County Water Control and Improvement District No. 1.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
1954	104.0	93.7	104.0	100.0	104.0	100.0	104.0	104.0	100.0	104.0	100.0	104.0	1,221.7
# Average	56.0	51.5	44.8	39.6	33.3	34.0	39.3	42.2	45.3	54.8	57.9	57.5	556.2

LAREDO SEWAGE OUTFALL

This sewage outfall enters the Rio Grande 885.7 river miles below the American Dam at El Paso, Texas and 1.4 river miles below the Laredo Gaging Station. The record is based on estimates by the Texas State Health Department.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
1954	171	202	212	184	209	186	148	196	172	151	191	198	2,220
# Average	163	167	186	184	192	167	176	183	166	155	169	165	2,073

* Period 1940-1954, some years missing Ø Period 1936-1954 # Period 1950-1954

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

In Thousands of Acre-Feet

Data are presented below for all storage reservoirs in the Rio Grande Basin, in the United States and Mexico, that exceed 15,000 acre-feet in capacity, and also for International Falcón Reservoir on the Rio Grande. The monthly figures represent the water in storage on the last day of each month, in thousands of acre-feet. The capacities indicated are at spillway level. Storage figures greater than the capacity indicate that the water surface was above spillway level.

The reservoirs and the sources of the data are: Rio Grande, Continental, Santa Maria, Terrace, and Mountain Home from the Colorado State Engineer; Sánchez from the San Luis Power and Water Company; Costilla from the Costilla Creek Compact Commission for New Mexico; El Vado from the Middle Rio Grande Conservancy District; Elephant Butte, Caballo, Alamogordo, McMillan, and Avalon from the United States Bureau of Reclamation; Red Bluff from the Red Bluff Water Power Control District; Willacy from the Willacy County Water Control and Improvement District No. 1; Boquilla, Colina, and Rosetilla from the Río Conchos Agriculture and the Electric Power Company of Mexico; Francisco I. Madero, Centenario and San Miguel, Venustiano Carranza, Marte Gómez, Culebrón, Villa Cárdenas, and Palito Blanco from the Ministry of Hydraulic Resources of Mexico; International Falcón Reservoir from the International Boundary and Water Commission.

The capacity shown below for Alamogordo Reservoir, in the United States, is a revised figure based on a new area-capacity curve furnished by the United States Bureau of Reclamation.

In the United States

Month	RIO GRANDE (Capacity 51.1)		CONTINENTAL (Capacity 26.7)		SANTA MARIA (Capacity 43.6)		TERRACE (Capacity 17.7)		MOUNTAIN HOME (Capacity 20.1)		SANCHEZ (Capacity 103.2)	
	1954	#Average 1927-1954	1954	#Average 1928-1954	1954	#Average 1928-1954	1954	#Average 1925-1954	1954	#Average 1924-1954	1954	#Average 1927-1954
Jan.	4.7	13.6	4.0	5.3	2.1	7.7	1.2	2.7	1.7	3.9	2.9	10.6
Feb.	5.9	14.8	4.9	5.6	2.4	8.3	1.4	3.0	1.9	4.4	3.4	10.8
Mar.	7.0	16.2	5.8	5.8	2.8	9.3	1.6	3.5	2.1	4.7	4.3	11.5
Apr.	7.0	15.7	5.6	6.3	2.8	10.8	2.0	4.1	2.4	5.4	6.4	13.3
May	0	23.2	4.9	8.4	2.8	15.8	1.9	7.1	4.1	7.7	9.8	18.6
June	0	24.7	.8	9.0	2.0	18.1	1.3	8.8	2.3	7.6	4.3	17.7
July	0	14.7	.8	6.7	1.2	12.4	1.0	5.5	1.4	5.4	1.7	12.2
Aug.	0	6.4	.8	4.6	.9	5.8	.9	2.8	.7	3.3	0	8.7
Sept.	0	6.2	.8	4.7	.9	5.3	.9	2.3	.5	2.9	.5	8.9
Oct.	0	7.4	.8	4.5	.9	5.6	1.0	2.5	1.0	3.0	1.2	9.6
Nov.	2.0	11.2	1.0	4.6	1.2	6.4	1.1	2.2	1.1	3.3	2.3	9.7
Dec.	3.4	13.2	2.2	5.0	1.8	6.9	1.0	2.5	1.3	3.6	3.1	10.0
Avg.	2.5	13.9	2.7	5.9	1.8	9.4	1.3	3.9	1.7	4.6	3.3	11.8
Max.	7.0	51.8	5.8	26.7	2.8	42.1	2.0	17.7	4.1	16.4	9.8	62.4
Min.	0	0	.8	0	.9	0	.9	0	.5	0	0	0

Month	COSTILLA (Capacity 15.7)		EL VADO (Capacity 200.3)		BLUEWATER (Capacity 43.5)		ELEPHANT BUTTE (Capacity 2,185.4)		CABALLO (Capacity 346.0)	
	1954	#Average 1922-1954	1954	Average 1935-1954	1954	#Average 1927-1954	1954	Average 1915-1954	1954	#Average 1938-1954
Jan.	ᵘ 5.9	4.1	0	54.0			137.2	921.9	16.5	166.1
Feb.	ᵘ 6.1	4.4	3.8	48.2			166.8	922.6	17.7	182.9
Mar.	ᵘ 6.4	5.0	4.5	44.9			138.5	909.9	28.4	164.7
Apr.	ᵘ 7.1	6.2	53.3	97.7			87.0	911.3	33.4	137.2
May	8.6	8.7	49.6	153.4	1954 Data		90.6	1,035.1	34.5	127.1
June	5.6	7.9	34.3	140.3			59.6	1,084.8	19.1	103.5
July	3.7	4.9	13.8	112.5	Not Available		13.8	1,027.2	22.3	74.5
Aug.	1.9	3.2	15.2	82.3			32.9	958.4	16.5	38.5
Sept.	1.5	2.7	0	65.7			55.6	918.9	10.6	32.2
Oct.	ᵘ 1.7	3.0	0	60.0			76.1	910.4	15.4	58.5
Nov.	ᵘ 1.9	3.4	0	53.5			80.8	909.9	16.5	87.2
Dec.	ᵘ 2.2	3.7	0	51.6			97.6	914.9	17.5	117.2
Avg.	4.4	4.8	14.5	80.3			86.4	952.1	20.7	107.5
Max.	8.6	15.1	53.3	203.5			Ø 173.7	Ø 2,302.8	Ø 37.8	Ø 346.6
Min.	ᵘ 1.5	0	0	0			Ø 9.9	Ø 3.3	Ø 8.6	Ø .1

Some months missing ᵘ Estimated Ø Daily extreme

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

In Thousands of Acre-Feet

In the United States

Month	ALAMOGORDO (Capacity 122.0)		McMILLAN and AVALON (Capacity 43.5)		RED BLUFF (Capacity 310.0)		WILLACY (Capacity 25.0)		TOTAL IN ** U.S. RESERVOIRS (Capacity 3,510.3)	
	1954	#Average 1937-1954	1954	#Average 1908-1954	1954	#Average 1936-1954	1954	#Average 1939-1954	1954	Estimated Average
Jan.	20.4	58.9	5.1	28.2	36.6	114.0	19.0	13.4	257.3	1,404.4
Feb.	25.5	63.0	5.1	28.4	36.9	117.4	16.8	12.4	298.6	1,426.2
Mar.	24.9	53.9	4.7	26.6	38.9	115.1	20.0	12.0	289.9	1,383.1
Apr.	3.2	41.4	.9	18.6	37.1	96.0	19.7	10.9	267.9	1,374.9
May	7.6	52.3	7.8	21.9	36.4	105.3	13.8	11.8	272.4	1,596.4
June	6.4	46.5	2.8	21.0	30.7	113.4	16.8	12.7	186.0	1,616.0
July	7.7	49.3	.5	18.1	20.7	99.3	15.3	12.8	103.9	1,455.5
Aug.	7.1	48.3	11.0	16.4	28.2	85.5	16.3	11.9	132.4	1,276.1
Sept.	26.8	47.7	1.9	18.3	18.8	87.6	15.2	14.2	134.0	1,217.6
Oct.	73.7	52.8	33.5	21.5	163.3	100.7	16.4	14.7	385.0	1,254.2
Nov.	76.2	52.3	37.4	23.0	163.0	105.0	14.5	13.5	399.0	1,285.2
Dec.	79.4	56.6	38.8	26.7	161.6	110.7	10.5	14.3	420.4	1,336.9
Avg.	29.9	51.9	12.5	22.4	64.4	104.2	16.2	12.9	262.2	1,385.5
Max.	79.4	156.3	38.8	85.5	163.3	327.5	20.0	22.0	420.4	
Min.	3.2	.4	.5	0	18.8	10.0	10.5	0	103.9	

In Mexico

Month	BOQUILLA (Capacity 2,417.5)		LA COLINA (Capacity 19.5)		ROSETILLA (Capacity 15.4)		MADERO (Capacity 344.6)		CENTENARIO and SAN MIGUEL (Capacity 19.9)	
	1954	#Average 1914-1954	1954	Average 1940-1954	1954	Average 1940-1954	1954	#Average 1948-1954	1954	Average 1934-1954
Jan.	506.6	1,398.3	17.5	17.8	15.3	13.7	126.9	144.8	9.2	12.1
Feb.	500.6	1,367.6	18.4	18.1	15.1	14.7	126.6	145.8	9.6	11.8
Mar.	481.9	1,318.2	18.6	17.7	14.2	14.1	124.0	141.6	2.7	8.5
Apr.	422.5	1,253.3	18.8	18.3	15.1	13.3	111.5	125.4	4.0	7.2
May	369.8	1,199.0	18.5	18.4	15.2	11.5	94.5	110.7	5.4	8.5
June	331.3	1,116.5	18.5	18.2	10.8	12.9	66.7	95.7	10.6	7.9
July	388.3	1,159.3	17.5	18.4	13.6	12.8	73.7	115.0	12.3	7.8
Aug.	674.8	1,320.1	16.7	17.9	15.1	12.8	169.9	124.5	10.5	8.4
Sept.	736.7	1,464.7	18.0	18.2	10.7	14.2	204.6	151.4	8.3	10.6
Oct.	807.1	1,457.9	18.8	17.9	13.3	14.1	245.8	160.1	17.3	12.5
Nov.	796.4	1,421.1	18.6	17.8	13.7	13.5	246.2	160.0	18.8	11.9
Dec.	785.0	1,403.8	18.4	17.4	15.1	14.4	246.2	159.2	16.8	11.9
Avg.	566.8	1,323.3	18.2	18.0	13.9	13.5	153.0	136.2	10.5	9.9
Max.	807.1	2,224.5	18.8	20.4	15.3	19.4	246.2	268.5	18.8	20.7
Min.	331.3	16.9	16.7	13.5	10.7	.4	66.7	1.4	2.7	0

Month	VENUSTIANO CARRANZA (Capacity 1,123.0)		MARTE GOMEZ (Capacity 876.4)		CULEBRON * (Capacity 90.0)		PALITO BLANCO (Capacity 124.0)		TOTAL IN MEXICAN RESERVOIRS (Capacity 5,030.3)	
	1954	Average 1930-1954	1954	#Average 1943-1954	1954	#Average 1939-1954	1954	Average 1942-1954	1954	Estimated Average
Jan.	102.9	376.8	818.0	517.4	37.5	43.6	83.3	39.8	1,717.2	2,564.3
Feb.	76.0	360.3	714.2	461.9	26.9	38.1	49.5	29.5	1,536.9	2,447.8
Mar.	63.1	339.6	699.6	401.0	51.7	32.2	68.5	31.2	1,524.3	2,304.1
Apr.	60.1	328.5	751.5	390.7	62.4	31.1	107.3	25.7	1,553.2	2,193.5
May	53.5	317.3	743.4	379.2	25.3	35.4	49.8	18.6	1,375.4	2,098.6
June	41.0	309.5	640.5	352.9	34.5	47.0	53.0	22.3	1,206.9	1,982.9
July	33.7	300.4	627.5	328.0	40.0	43.2	60.5	31.5	1,267.1	2,016.4
Aug.	23.6	303.5	608.0	442.2	37.5	42.5	42.0	31.4	1,598.1	2,303.3
Sept.	16.2	350.9	601.5	515.7	27.1	55.2	34.2	44.6	1,657.3	2,625.5
Oct.	31.8	371.1	679.4	559.9	59.9	62.2	60.7	60.0	1,934.1	2,715.7
Nov.	35.0	380.3	681.8	553.3	54.8	52.8	63.0	59.5	1,928.3	2,670.2
Dec.	33.6	381.0	666.4	553.7	44.9	50.5	55.9	53.7	1,882.3	2,645.6
Avg.	47.5	343.3	686.0	454.7	41.9	44.5	60.6	37.3	1,598.4	2,380.6
Max.	102.9	1,163.4	818.0	991.5	62.4	116.8	107.3	140.1		
Min.	16.2	† 1.0	601.5	‡ 17.8	25.3	0	34.2	0		

Some months missing * Includes Villa Cárdenas † Minimum since full reservoir in 1932 ‡ Minimum since full reservoir in 1947 ** Excludes Bluewater Reservoir

STORED WATER IN LARGE RESERVOIRS OF THE RIO GRANDE BASIN

International Falcón Reservoir

Falcón Dam is the lowermost of the major international storage dams authorized for construction on the Rio Grande by the Water Treaty of 1944 between the United States and Mexico and was the first dam constructed. It is located 86 river miles downstream from Laredo, Texas and Nuevo Laredo, Tamaulipas, 105 river miles upstream from Hidalgo, Texas and Reynosa, Tamaulipas, 970.9 river miles below the American Dam, and 270.5 river miles above the Gulf of Mexico.

Falcón Dam and Reservoir serve to control and regulate floods and other flows of the Rio Grande for domestic and irrigation uses downstream in the two countries, and serve incidental purposes, including the generation of hydroelectric energy at two identical power plants, one on each side of the river immediately below the dam. In the course of construction of Falcón Dam, the flow of the Rio Grande was diverted through the temporary outlets on December 29, 1952. These outlets were closed and permanent storage began on August 25, 1953, although some small storage occurred prior to that time when the flow of the river exceeded the capacity of the temporary outlets.

The stored water belonging to each country is based on their respective river and tributary flows, consumptive uses, and losses, as specified in the Water Treaty.

Storage Capacities

Elevation	Description	At Indicated Elevation		Between Indicated Elevations	
		Reservoir Capacity Acre-Feet	Reservoir Area Acres	Storage Volume Acre-Feet	Type of Storage
175.0	River Bed at Dam Axis	0	0		
				16,455	Silt and Dead
204.34	Lowest Outlet (Mexican Penstock)	16,455	1,449		
				2,424,073	Silt and Conservation
296.4	Top of Conservation Storage	2,440,528	78,451		
				908,759	Ordinary Flood
306.7	Top of Spillway Gates	3,349,287	98,805		
				801,684	Super Flood
314.2	Maximum Water Surface	4,150,971	115,581		

During the winter months, 400,000 acre-feet of the flood control capacity may be utilized for additional conservation storage.

Water-Surface Elevations and Stored Water

Water-Surface Elevations in Feet Above Mean Sea Level, U.S.C. & G.S. Datum

Storage in Thousands of Acre-Feet

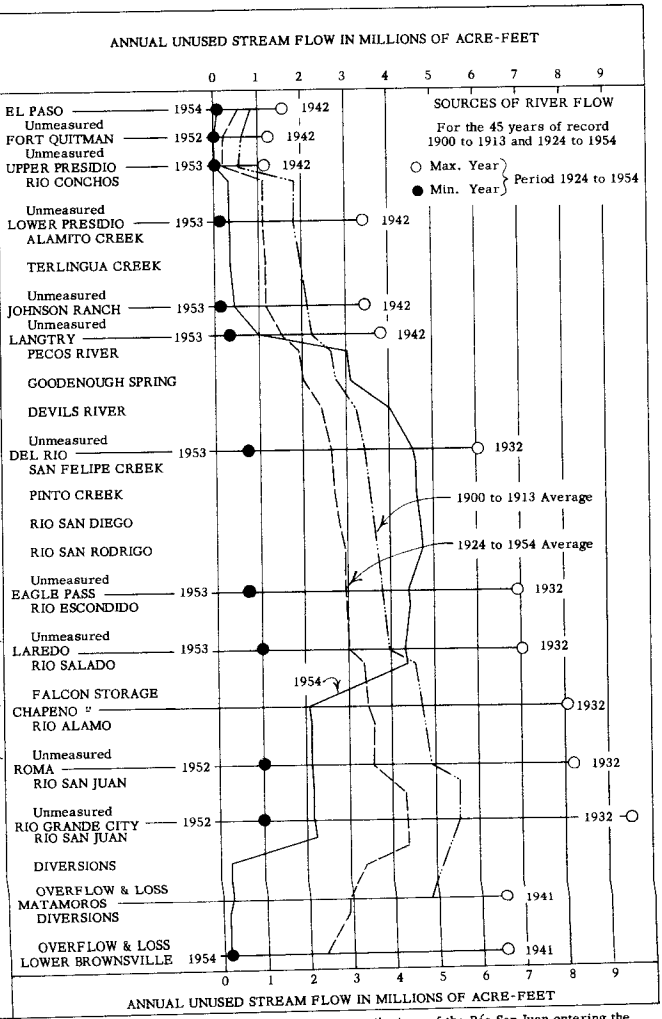
Month	Last Day of Month At Midnight		MONTHLY						
			AVERAGE	MAXIMUM			MINIMUM		
1954	Elevation	Storage	Storage	Elevation	Storage	Day	Elevation	Storage	Day
Dec. *	270.76	945.5							
Jan.	267.11	805.6	883.9	270.76	945.5	1	267.11	805.6	31
Feb.	259.34	554.2	688.9	267.11	805.6	1	259.34	554.2	31
Mar.	248.52	310.2	430.7	259.34	554.2	1	248.52	310.2	31
Apr.	256.97	490.2	360.4	256.97	490.2	30	243.47	233.1	8
May	258.91	542.1	490.1	259.26	552.0	29	255.15	445.1	23
June	279.27	1,336.3	523.2	279.27	1,336.3	30	252.11	377.7	16
July	292.80	2,169.2	2,157.3	292.94	2,179.3	18	279.27	1,336.3	1
Aug.	293.40	2,212.9	2,144.0	293.40	2,212.9	31	292.05	2,115.4	†23
Sept.	294.12	2,266.1	2,263.2	294.22	2,273.6	17	293.40	2,212.9	1
Oct.	295.97	2,407.0	2,378.8	296.04	2,412.4	27	294.12	2,266.1	1
Nov.	295.95	2,405.4	2,412.9	296.18	2,423.3	14	295.93	2,403.8	† 6
Dec.	295.20	2,347.6	2,377.7	295.96	2,406.2	† 1	295.20	2,347.6	31
Yearly			1,432.4	296.18	2,423.3		243.47	233.1	

* December 1953 † And other days

SOURCES OF RIVER FLOW

The graph and the column of figures on this page represent data on the annual yield of drainage areas tributary to various stream gaging stations in the Rio Grande Watershed. The graphic values are for the entire tributary area, while the column figures are reduced to the yield from one average square mile of the tributary area. There were no reservoirs of consequence on the area from 1900 to 1913; therefore, the figures in the first column correspond to those for that period in the graph. Because more than 10,000,000 acre-feet of reservoir capacity have been developed on the watershed since 1913, in which large volumes of unused runoff are stored in some years and released in later years as unused stream flow (thus reducing the unused stream flow in some years and adding thereto in others), it is significant to differentiate between the unused runoff and unused stream flow.

AVERAGE ANNUAL UNUSED Acre-Feet per Square Mile			
RUNOFF		STREAM FLOW	
1900-1913	1924-1954	1924-1954	
29.7	16.9	18.3	EL PASO — 1954 — 1942
			Unmeasured
19.6	5.3	6.6	FORT QUITMAN — 1952 — 1942
			Unmeasured
16.4	4.5	5.7	UPPER PRESIDIO — 1953 — 1942
51.0	36.8	38.2	RIO CONCHOS
			Unmeasured
			LOWER PRESIDIO — 1953 — 1942
			ALAMITO CREEK
20.7	21.0	21.0	TERLINGUA CREEK
			Unmeasured
			JOHNSON RANCH — 1953 — 1942
			Unmeasured
28.2	18.5	19.5	LANGTRY — 1953 — 1942
12.4	10.7	10.5	PECOS RIVER
			GOODENOUGH SPRING
106.1	100.9	100.9	DEVILS RIVER
55.7	68.4	68.4	Unmeasured
28.0	21.2	21.7	DEL RIO — 1953 — 1932
			SAN FELIPE CREEK
			PINTO CREEK
112.6	63.9	63.7	RIO SAN DIEGO
			RIO SAN RODRIGO
			Unmeasured
30.4	22.4	22.9	EAGLE PASS — 1953 — 1932
32.7	29.6	29.6	RIO ESCONDIDO
			Unmeasured
30.5	22.7	23.2	LAREDO — 1953 — 1932
27.2	16.6	16.3	RIO SALADO
			FALCON STORAGE
			CHAPENO [u] — 1932
65.1	50.4	36.0	RIO ALAMO
			Unmeasured
31.1	22.7	22.7	ROMA — 1952 — 1932
52.8	* 60.9	58.2	RIO SAN JUAN
			Unmeasured
			RIO GRANDE CITY — 1952 — 1932
			RIO SAN JUAN
			DIVERSIONS
			OVERFLOW & LOSS
			MATAMOROS — 1941
			DIVERSIONS
			OVERFLOW & LOSS
			LOWER BROWNSVILLE — 1954 — 1941



[u] Values prior to 1953 are considered the same as for Zapata gaging station. * Includes contributions of the Río San Juan entering the Rio Grande above and below Rio Grande City.

DIVERSIONS FROM THE RIO GRANDE
AMERICAN CANAL AT EL PASO, TEXAS

DESCRIPTION: An open channel rating station in a concrete-lined canal with a water-stage recorder located 2,350 feet below the head gates at the American Dam near El Paso, Texas. Measurements are made at the downstream end of the first covered section of this canal, 835 feet below the recorder. The zero of the gage is 3,712.09 feet above mean sea level, U.S.C. & G.S. datum.

RECORDS: Based on 29 meter measurements during the year, a stable rating curve at medium and high flows, and a continuous record of gage heights. After May 7, 1954, computations for flows below gage height 2.80 feet (discharge approximately 30 second-feet) are based on auxiliary recorder, 400 feet below head gates. Records available: June 2, 1938 through December 1954.

REMARKS: This canal diverts water from the Rio Grande at the American Dam near El Paso, Texas, 2.1 river miles above the International Dam near Juárez, Chihuahua. Water from this canal discharges into the Franklin Canal from which water is frequently returned to the Rio Grande at spillways 2.2, 2.7, and 3.6 river miles below the American Dam.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 1,840 second-feet on March 27, 1944. Min. frequently no flow.

Average Flow in Second-Feet

Daily:	Max. 1,510	Aug. 13, 1945	Min. 0		Frequently
Monthly:	Max. 1,210	Aug. 1943	Min. 0		Six months, 1952-1954
Yearly:	Max. 748	1943	Min. 99.6		1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	u 14.0	465	166	98.0	309	138	26.5	u 3.5	11.0	1.2
2	0	0	u 21.6	465	200	146	308	108	96.0	57.0	5.0	0
3	0	0	u 22.0	477	181	118	294	99.6	162	264	9.8	0
4	0	0	u 23.0	524	143	153	223	104	230	64.9	10.0	0
5	0	0	* 24.0	563	131	119	128	118	216	31.4	10.1	0
6	0	0	* 18.6	613	58.9	115	96.8	147	* 106	18.0	11.4	0
7	0	0	* 18.6	581	55.3	121	121	270	54.1	14.1	11.3	0
8	0	0	* 16.0	486	29.0	109	136	212	29.4	249	9.9	0
9	0	0	* 14.2	443	20.8	160	208	196	23.5	143	4.4	0
10	0	0	* 9.8	416	21.7	159	207	u 90.6	15.7	121	5.8	0
11	0	0	* 8.5	440	24.8	185	214	229	13.2	38.3	9.4	0
12	0	0	* 9.8	389	43.2	184	225	* 81.1	14.3	18.7	4.1	0
13	0	0	* 9.0	358	70.0	200	271	* 74.4	12.4	13.1	9.0	0
14	0	0	* 9.6	333	118	260	279	* 73.1	4.8	11.5	11.3	0
15	0	0	* 10.6	222	159	310	272	u 27.2	u 3.5	10.9	9.9	0
16	0	0	* 11.5	180	232	354	294	u 16.4	u 3.0	10.6	6.9	0
17	0	0	* 9.3	183	249	340	318	u 6.5	u 3.0	10.3	6.8	0
18	0	0	* 10.9	199	327	352	322	u 14.8	u 3.0	4.6	6.7	0
19	0	0	* 9.8	180	364	308	273	u 20.9	u 3.0	u 4.0	6.7	0
20	0	0	* 9.0	123	174	298	282	* 68.4	u 3.5	6.1	10.4	0
21	0	0	* 8.5	133	134	236	196	457	3.5	4.5	10.7	0
22	0	0	* 10.9	134	128	204	161	255	u 3.3	6.1	10.6	0
23	0	0	* 10.9	105	144	193	189	398	u 4.0	6.1	8.8	0
24	0	0	* 15.1	147	163	179	226	270	u 5.0	9.9	6.6	0
25	0	0	* 33.6	151	160	133	360	446	25.0	6.2	9.5	0
26	0	0	298	171	156	193	230	211	17.9	4.5	8.9	0
27	0	0	352	218	155	207	* 236	u 54.3	17.8	6.0	6.5	0
28	0	0	344	183	131	235	u 248	u 51.5	13.2	4.8	9.5	0
29	0		392	185	124	207	* 176	u 44.0	7.8	8.4	8.8	0
30	0		483	138	108	266	156	u 36.5	3.9	10.3	8.3	0
31	0		481		91.4		154	u 29.2		9.8		0
Sum	0	0	2,708.8	9,205	4,262.1	6,142.0	7,112.8	4,347.5	1,124.3	1,170.6	258.1	1.2

Month	Current Year 1954 Extreme Gage Feet High	Low	Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period June 1938-1954 Acre-Feet Average	Maximum	Minimum
Jan.						0	0	0	1,661	8,110	0
Feb.						0	0	0	8,184	19,500	0
Mar.	6.70		31	497	1	0	87.4	5,370	32,281	50,100	5,370
Apr.	7.39	3.20	6	636	15	50.3	307	18,300	47,838	70,900	18,300
May	8.78		18	982	9	18.9	137	8,450	40,078	69,000	8,450
June	5.92	3.56	16	364	1	76.1	205	12,200	46,777	65,700	12,200
July	7.56	3.34	25	674	6	59.7	229	14,100	53,676	70,700	14,100
Aug.	9.63		21	1,240	17	u 5.4	140	8,620	54,212	74,600	8,620
Sept.	5.18		4	260	†16	Ø* 3.0	37.5	2,230	36,584	63,100	2,230
Oct.	7.50		2	660	27	0	37.8	2,320	18,269	39,100	2,320
Nov.			14	17.8	16	0	8.6	512	10,500	21,000	512
Dec.			1	3.4	† 1	0	0	2.4	10,983	25,500	2.4
Yearly	9.63			1,240		0	99.6	72,104.4	361,043	541,610	72,104.4

u Estimated * Partly estimated † And other days Ø Mean daily

DIVERSIONS FROM THE RIO GRANDE
ACEQUIA MADRE NEAR JUAREZ, CHIHUAHUA

DESCRIPTION: Water-stage recorder and bridge for meter measurements, located about 260 feet below the canal intake at the International Dam at Juárez, Chihuahua, which is 2.1 river miles below the American Dam at El Paso, Texas.

RECORDS: Based on 29 meter measurements during the year, 18 by the Mexican and 11 by the United States Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: 1938 through December 1954. These records, showing the water actually diverted by Mexico, do not necessarily reflect the quantities of water made available to Mexico in the bed of the river by the United States under terms of the Convention of 1906. Such quantities of water are included in the record of "Rio Grande below American Dam", see page 8 herein.

REMARKS: In 1954, all of the 10,147 acre-feet tabulated below were distributed to land irrigated in the first unit under the canal.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 480 second-feet on July 21, 1944, with a gage height of 6.00 feet. Min. no flow through winter months.

Average Flow in Second-Feet

Daily:	Max.	339	May 10, 1942	Min.	0	Several months each year
Monthly:	Max.	283	May 1938	Min.	0	Several months each year
Yearly:	Max.	116	1942	Min.	14.0	1954

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	0	0	138	0	0	0	0	0	0	0
2	0	0	0	0	137	0	0	0	0	0	0	0
3	0	0	0	0	138	0	0	0	0	0	0	0
4	0	0	0	0	143	0	0	0	0	0	0	0
5	0	0	0	0	139	0	0	0	0	0	0	0
6	0	0	0	0	137	0	0	0	0	0	0	0
7	0	0	0	0	138	0	0	0	0	0	0	0
8	0	0	0	0	137	0	0	0	0	0	0	0
9	0	0	0	0	136	0	0	0	0	0	0	0
10	0	0	0	0	139	0	51.6	0	0	0	0	0
11	0	0	0	0	144	0	104	0	0	0	0	0
12	0	0	0	0	142	0	95.3	0	0	0	0	0
13	0	0	0	0	147	0	89.0	0	0	0	0	0
14	0	0	0	0	144	0	85.8	0	0	0	0	0
15	0	0	0	85.8	143	0	83.3	0	0	0	0	0
16	0	0	0	148	3.5	0	84.4	0	0	0	0	0
17	0	0	0	126	0	0	85.5	0	0	0	0	0
18	0	0	0	123	0	0	84.8	0	0	0	0	0
19	0	0	0	121	0	0	83.3	0	0	0	0	0
20	0	0	0	135	0	0	7.8	0	0	0	0	0
21	0	0	0	134	0	0	0	38.8	0	0	0	0
22	0	0	0	130	0	0	0	0	0	0	0	0
23	0	0	0	133	0	0	0	0	0	0	0	0
24	0	0	0	134	0	0	0	0	0	0	0	0
25	0	0	0	135	0	0	0	0	0	0	0	0
26	0	0	0	136	0	0	0	0	0	0	0	0
27	0	0	0	151	0	0	0	0	0	0	0	0
28	0	0	0	143	0	0	0	0	0	0	0	0
29	0		0	141	0	0	0	0	0	0	0	0
30	0		0	139	0	0	0	0	0	0	0	0
31	0		0		0		0	0		0		0
Sum	0	0	0	2,114.8	2,105.5	0	854.8	38.8	0	0	0	0

Month	1938-1954 Average Rainfall Inches **		Current Year 1954 Extreme Second-Feet High		Low		Average Second-Feet	Total Acre-Feet	Period 1938-1954 Acre-Feet Average	Maximum	Minimum
			Day		Day						
Jan.	.42	.06		0		0	0	0	0	0	0
Feb.	.26	.02		0		0	0	0	0	0	0
Mar.	.26	.05		0		0	0	0	1,392	5,540	0
Apr.	.22	.18	16	155	† 1	0	70.5	4,190	6,410	11,720	2,030
May	.46	1.07	5	155	†17	0	67.9	4,180	11,966	17,380	4,180
June	.76	.44		0		0	0	0	9,531	15,700	0
July	1.52	.88	11	114	† 1	0	27.6	1,700	9,491	15,170	1,700
Aug.	1.36	3.76	21	203	† 1	0	1.3	77.0	9,300	12,410	77.0
Sept.	.97	.44		0		0	0	0	6,706	12,380	0
Oct.	.81	.83		0		0	0	0	90.8	328	0
Nov.	.25	0		0		0	0	0	0	0	0
Dec.	.52	T		0		0	0	0	0	0	0
Yearly	7.81	7.73		203		0	14.0	10,147	54,886.8	83,930	10,147

† And other days ** Average for valley floor from El Paso to Island Station.

DIVERSIONS FROM THE RIO GRANDE
MAVERICK CANAL AT MILE 13
NEAR QUEMADO, TEXAS

DESCRIPTION: For power generation and irrigation use, water is diverted into the main Maverick Canal from the Rio Grande at a point 17.4 river miles below the international bridge between Del Rio, Texas and Cd. Acuña, Coahuila and 711.0 river miles below the American Dam at El Paso, Texas. At a point 31.8 canal miles below the headworks of this canal, a portion of the diverted water returns to the river through the Maverick Power Plant and the remainder enters the Maverick Canal Extension. The discharges shown below are based on records of stage and measurements of discharge at a point approximately 13 canal miles below the diversion point.

RECORDS: Based on 22 meter measurements and a continuous record of gage heights. Computations by shifting channel methods. Records available: June 21, 1949 through December 1954.

REMARKS: In 1954, a total of 37,417 acres of land was irrigated from this canal and its extension, of which 475 acres were above this gaging station, 9,414 acres were between this point and the Canal Extension, and 27,528 acres were irrigated from the Maverick Canal Extension. A total of 483,480 acre-feet of water returned to the Rio Grande at the power plant and some returned through the irrigation system.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 1,650 second-feet on May 27, 1952. Min. no flow several days in June, July, and November 1954.

Average Flow in Second-Feet

Daily:	Max.	1,620	July 13, 1952	Min.	0	June 28 through July 11 & Nov. 2, 1954
Monthly:	Max.	* 1,530	July 1952	Min.	ᵘ 319	July 1954
Yearly:	Max.	1,390	1950	Min.	935	1953

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,000	992	900	692	1,390	1,390	0	ᵘ 820	1,140	1,310	78.8	1,280
2	1,010	1,020	902	666	1,400	1,400	0	ᵘ 890	1,180	1,360	0	1,320
3	1,010	1,020	910	654	1,400	1,410	0	ᵘ 940	1,160	1,420	62.4	1,330
4	1,010	1,020	907	672	1,430	1,390	0	ᵘ 930	1,150	1,450	1,190	1,310
5	1,010	1,030	899	717	1,410	1,410	0	ᵘ 950	1,160	1,450	1,390	1,310
6	1,030	1,010	903	712	1,380	1,400	0	ᵘ 960	1,190	1,270	1,380	1,300
7	1,020	979	879	702	1,350	1,310	0	ᵘ 960	1,260	1,360	1,420	1,280
8	1,020	953	886	722	1,330	1,240	0	ᵘ 960	1,260	1,420	1,430	1,310
9	1,020	954	904	738	1,290	1,210	0	ᵘ 980	1,290	1,430	1,430	1,280
10	1,040	944	855	868	1,240	1,380	0	ᵘ 990	1,300	1,470	1,430	1,200
11	1,040	928	865	1,050	1,190	1,400	0	ᵘ 1,050	1,300	1,460	1,440	1,220
12	1,030	894	857	906	1,120	1,390	ᵘ 75.0	ᵘ 1,100	1,320	1,480	1,440	ᵘ1,230
13	1,010	890	857	1,080	1,180	1,390	ᵘ 146	ᵘ 1,090	1,320	ᵘ 1,470	1,420	ᵘ1,240
14	1,020	898	870	1,270	1,080	1,400	ᵘ 217	ᵘ 1,120	1,320	ᵘ 1,470	1,420	*1,240
15	1,020	910	878	1,270	1,130	ᵘ 1,550	ᵘ 288	* 1,150	1,390	* 1,450	1,420	1,190
16	1,010	916	818	1,230	1,090	ᵘ 1,510	ᵘ 330	* 1,150	1,410	1,430	1,420	1,170
17	998	878	844	1,250	1,080	ᵘ 1,410	ᵘ 476	* 1,130	1,420	1,400	*1,390	1,170
18	1,020	876	898	1,200	1,100	ᵘ 1,400	ᵘ 410	* 1,130	1,420	1,410	ᵘ1,420	1,180
19	1,030	914	911	1,240	1,340	ᵘ 1,430	ᵘ 427	1,120	1,420	1,390	ᵘ1,420	1,180
20	1,030	949	870	1,320	1,320	ᵘ 1,460	ᵘ 585	1,120	1,410	1,420	ᵘ1,390	1,170
21	1,020	926	829	1,350	1,400	* 1,350	ᵘ 554	1,130	1,420	1,430	ᵘ1,390	1,190
22	990	906	816	1,340	1,380	1,370	ᵘ 476	1,130	1,420	1,430	ᵘ1,400	1,200
23	970	952	824	1,230	1,370	1,360	ᵘ 626	* 1,170	1,450	1,440	ᵘ1,390	1,220
24	953	949	811	1,230	1,420	1,350	ᵘ 630	* 1,210	1,450	1,440	ᵘ1,390	1,210
25	974	975	796	1,350	1,380	1,360	ᵘ 680	* 1,230	1,470	1,450	ᵘ1,370	1,200
26	977	994	773	1,350	1,350	1,380	ᵘ 687	ᵘ 1,190	1,480	1,450	ᵘ1,320	1,200
27	974	975	771	1,360	1,340	963	ᵘ 706	ᵘ 1,110	1,460	1,450	ᵘ1,310	1,200
28	984	932	745	1,370	1,380	0	ᵘ 634	ᵘ 1,090	1,440	1,450	ᵘ1,310	1,220
29	1,010		732	1,380	1,400	0	ᵘ 638	1,090	1,470	1,460	*1,310	1,210
30	992		753	1,390	1,410	0	ᵘ 656	1,100	1,490	1,460	1,280	1,110
31	1,010		748		1,410		ᵘ 658	1,110		1,320		1,200
Sum	31,232	26,584	26,211	32,309	40,490	* 37,013	ᵘ 9,899.0	* 33,100	40,370	44,100	*37,461.2	38,070

Month	Current Year 1954 Extreme Gage Feet High	Extreme Gage Feet Low	Extreme Second-Feet High Day	High	Extreme Second-Feet Low Day	Low	Average Second-Feet	Total Acre-Feet	Period July 1949-1954 ** Acre-Feet Average	Maximum	Minimum
Jan.	3.33	2.86	11	1,070	23	950	1,010	61,900	73,560	89,500	61,900
Feb.	3.34	2.41	† 2	1,040	17	858	949	52,700	65,480	82,500	52,700
Mar.	3.23	2.37	3	954	28	717	846	52,000	70,240	90,700	52,000
Apr.	4.38	2.10	30	1,410	† 2	649	1,080	64,100	63,820	81,000	* 45,400
May	4.67	3.07	24	1,480	18	968	1,310	80,300	68,600	82,200	ᵘ 39,400
June			15	ᵘ 1,550	†27	0	*1,230	* 73,400	71,200	86,800	34,400
July			27	ᵘ 706	† 1	0	ᵘ 319	ᵘ 19,600	* 68,467	* 93,900	ᵘ 19,600
Aug.			25	Ø* 1,230	1	Øᵘ 820	*1,070	* 65,700	* 74,583	88,500	64,100
Sept.	4.85	3.46	25	1,520	1	1,120	1,350	80,100	74,700	* 84,500	47,000
Oct.	4.62	.70	5	1,480	31	517	1,420	87,500	* 75,150	87,500	* 54,300
Nov.	4.32		11	1,440	† 1	0	*1,250	* 74,300	70,417	82,800	55,900
Dec.	4.35	3.11	3	1,370	30	1,000	1,230	75,500	72,900	85,600	58,600
Yearly				Øᵘ 1,550		0	*1,090	* 787,100	* 849,117	1,004,200	676,900

ᵘ Estimated * Partly estimated † And other days Ø Mean daily ** Records from July 1949 to March 1952 are for Maverick Canal at Las Moras Creek Station, April through July 1952 from Maverick Canal at Mile 3 Station, and from August 1952 through 1954 from Maverick Canal at Mile 13 Station.

DIVERSIONS FROM THE RIO GRANDE
MAVERICK CANAL EXTENSION BELOW THE POWER PLANT
NEAR EAGLE PASS, TEXAS

DESCRIPTION: The main Maverick Canal divides into two branches at a point about 31.8 canal miles below the point at which water from the Rio Grande is diverted. One branch leads to the Maverick Power Plant and back to the Rio Grande. The other branch forms this Maverick Canal Extension, which is used to transmit irrigation water. The water-stage recorder is located at a wood pile bridge about 1 mile below the heading of this canal extension. Meter measurements are made from the bridge.

RECORDS: Based on 20 meter measurements during the year and a continuous record of gage heights. Computations by shifting channel methods. Records available: April 1, 1939 through December 1954.

REMARKS: Irrigation from this canal extension began in June 1938, and in 1954, 27,528 acres of land north and south of Eagle Pass were irrigated. Some water from this canal extension returns to the river through the irrigation system which extends approximately 67 canal miles downstream.

EXTREME FLOWS FROM RECORDS: Momentary: Max. 502 second-feet on June 15, 1954. Min. occasionally no flow.

Average Flow in Second-Feet

Daily:	Max. 465	June 12, 1954	Min. 0	Occasionally	
Monthly:	Max. 394	July 1951	Min. ᵘ 18.7	March	1939
Yearly:	Max. 321	1952	Min. 62.1		1939

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	275	* 167	296	361	269	205	0	265	310	334	55.4	329
2	278	* 167	296	380	266	222	0	322	308	334	0	329
3	274	* 195	295	396	262	245	0	292	307	319	0	329
4	274	210	297	418	279	244	0	288	279	340	155	311
5	271	214	299	425	289	255	0	283	271	266	317	303
6	272	209	294	410	293	261	0	282	285	211	304	299
7	272	207	298	394	295	286	0	278	307	212	305	298
8	269	207	293	376	323	360	0	279	307	223	310	305
9	269	209	293	249	322	410	0	282	304	241	310	303
10	277	219	293	160	335	457	0	275	300	245	305	295
11	272	259	293	175	351	460	0	270	298	246	327	296
12	260	260	291	214	388	465	0	292	301	250	374	299
13	251	264	295	252	415	452	0	305	298	248	341	303
14	247	266	294	184	398	444	ᵘ 50.0	304	302	248	294	302
15	253	264	318	113	428	* 290	ᵘ 158	305	293	246	304	296
16	251	262	337	110	415	ᵘ 170	* 235	304	288	246	305	298
17	252	258	345	105	419	ᵘ 176	338	298	289	242	302	301
18	254	260	355	109	387	ᵘ 172	272	298	292	253	303	297
19	260	263	352	122	263	* 208	289	238	295	289	315	300
20	252	262	339	168	255	239	370	165	291	316	329	298
21	254	263	342	210	274	256	367	212	293	315	330	299
22	258	262	348	247	312	295	405	269	288	319	335	296
23	257	265	355	242	341	295	403	304	289	318	345	294
24	253	257	386	246	209	365	407	302	289	316	332	292
25	264	272	390	258	201	403	383	288	303	324	336	299
26	261	301	370	260	198	146	380	290	326	315	335	297
27	262	297	363	260	197	0	370	298	326	317	327	302
28	* 210	297	392	259	201	0	349	292	325	316	329	303
29	* 171		388	262	213	0	383	299	330	315	321	301
30	169		380	265	216	0	364	300	330	313	325	299
31	167		375		215		379	308		311		306
Sum	7,809	6,836	10,262	7,630	9,229	7,781	5,902.0	8,787	9,024	8,788	8,570.4	9,379

Month	1939-1954 Average Rainfall Inches **	Current Year 1954						Average Second-Feet	Total Acre-Feet	Period 1939-1954 Acre-Feet		
		Extreme Second-Feet										
		High		Low						Average	Maximum	Minimum
		Day		Day								
Jan.	.96	1.03	12	285	31	167		252	15,500	10,913	19,800 ᵘ	2,140
Feb.	.96	.02	26	311	† 1	Ø* 167		244	13,600	9,980	18,200 ᵘ	2,120
Mar.	.82	.04	28	412	8	280		331	20,400	11,382	20,400 ᵘ	1,150
Apr.	1.50	2.70	5	443	†16	103		254	15,100	11,183	22,100	3,430
May	3.26	3.24	15	436	25	195		298	18,300	9,709	21,800	2,840
June	1.89	3.08	15	502	†26	0		259	15,400	10,112	20,000	3,750
July	1.17	.55	25	433	† 1	0		190	11,700	11,842	24,300	4,510
Aug.	2.40	1.39	2	398	19	151		283	17,400	11,009	20,300	3,480
Sept.	2.44	.44	30	337	† 4	266		301	17,900	9,983	18,300	4,600
Oct.	1.54	1.62	4	348	3	154		283	17,400	11,688	* 21,800	5,130
Nov.	.61	.13	†12	404	† 1	0		286	17,000	11,878	* 20,000	4,170
Dec.	.68	T	3	339	24	277		303	18,600	12,406	20,200	4,280
Yearly	18.23	14.24		502		0		274	198,300	132,085	* 233,300	44,950

ᵘ Estimated * Partly estimated † And other days Ø Mean daily ** On U.S. side from Quemado to Cuervo Creek (formerly called San Antonio Creek)

DIVERSIONS FROM THE RIO GRANDE
UNITED STATES SIDE BELOW RIO GRANDE CITY, TEXAS

The total diversion of 1,454,000 acre-feet to this area was made almost entirely by pumping water from the river to irrigate 648,641 acres. Diversions were actually measured for approximately 85% of the acreage. Diversions to the remainder were estimated. Measurements, in general, were made by Venturi meters, by open channel rating stations, and deflection meters developed by this Commission. There is some re-use of drainage water within the area. Drainage water which escapes from the area does not return to the Rio Grande. In addition to the irrigated area, there were 35,566 acres of land cultivated within the area. More than one crop per year is often grown on some of the land.

Average Flow in Second-Feet

Daily ⊕:	Max.	5,400	June 15, 1951	Min.	0	Sept. 25, 1949; Oct. 25, 1951
Monthly:	Max.	3,660	June 1949	Min.	25.2	June 1930
Yearly:	Max.	2,060	1950	Min.	653	1941

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,230	3,690	2,400	2,750	1,180	4,590	1,100	1,430	1,600	1,000	979	1,630
2	1,060	3,680	2,450	2,580	1,430	4,780	1,400	2,000	1,440	1,080	1,030	1,690
3	1,160	3,700	2,710	2,910	2,080	4,530	711	1,960	1,540	692	991	1,660
4	1,580	3,570	2,640	2,910	1,600	4,340	411	2,150	1,140	264	1,010	1,420
5	1,510	3,230	2,020	3,230	1,860	4,040	314	2,060	944	56	1,090	1,190
6	1,640	3,050	1,990	3,450	2,600	3,970	668	1,850	1,220	378	1,050	1,990
7	2,130	2,660	2,240	3,970	3,190	4,270	772	1,780	1,630	557	944	1,840
8	2,440	3,160	2,550	4,040	3,410	4,550	710	1,490	1,660	249	1,400	1,610
9	2,030	3,170	2,310	2,210	3,060	4,460	573	2,180	1,540	104	1,460	1,680
10	1,360	2,770	1,990	1,470	2,730	4,350	879	2,340	1,770	74	607	1,530
11	3,560	2,750	2,110	1,700	2,380	4,370	1,130	2,530	1,560	119	378	1,360
12	3,600	2,860	2,400	1,460	2,240	4,290	1,310	2,540	1,130	186	623	1,200
13	3,160	2,650	2,180	1,050	2,520	4,650	1,240	2,380	1,250	367	712	1,680
14	3,200	2,440	2,240	893	2,560	4,790	1,190	2,050	1,020	510	408	1,650
15	2,850	2,590	2,640	564	2,540	4,860	1,130	1,770	1,350	586	848	1,990
16	2,930	2,720	2,830	539	2,250	4,750	1,350	2,190	1,440	379	931	1,890
17	3,140	2,930	2,780	558	2,310	4,930	1,470	2,160	1,120	314	909	1,860
18	3,870	2,990	2,640	582	2,500	4,800	1,120	2,260	595	706	1,000	1,510
19	4,430	2,760	2,920	462	3,020	4,180	1,370	2,460	572	1,040	1,320	1,110
20	4,430	2,670	3,050	349	3,470	3,560	1,100	2,350	1,030	1,000	1,520	2,110
21	3,500	2,190	2,620	294	4,310	3,850	1,230	1,320	1,380	1,170	1,110	2,320
22	3,090	2,760	2,160	268	4,300	4,090	1,280	1,120	1,360	1,140	1,710	2,130
23	3,460	3,090	1,840	297	3,880	4,100	1,480	1,620	1,350	702	1,760	1,720
24	2,820	2,660	2,000	242	4,200	3,020	1,440	1,690	1,730	990	1,640	774
25	2,960	2,480	2,370	234	4,320	1,340	1,210	1,700	1,500	1,470	1,310	534
26	3,050	2,360	2,660	285	4,420	595	1,880	1,710	961	1,270	1,790	1,030
27	3,410	2,190	2,500	285	4,270	382	2,050	1,580	1,700	1,260	1,510	2,350
28	3,670	2,080	1,990	369	4,280	722	2,080	1,260	1,640	916	1,130	2,230
29	4,050		2,830	371	4,170	431	2,020	734	1,730	896	1,900	2,020
30	4,020		3,230	872	3,730	336	1,890	1,420	1,270	872	1,820	1,830
31	3,610		3,250		4,330		1,830	1,790		539		1,790
Sum	88,950	79,850	76,540	41,194	95,140	107,926	38,338	57,874	40,172	20,886	34,890	51,328

Month	1922-1954 Average Rainfall Inches **	Current Year 1954 Rainfall Inches **	Ø Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1922-1954 Acre-Feet Average	Maximum	Minimum
Jan.	1.35	.18	†19	4,430	2	1,060	2,870	176,000	50,309	176,000	7,700
Feb.	.99	.07	3	3,700	28	2,080	2,850	158,000	64,891	158,000	6,960
Mar.	1.13	.28	31	3,250	23	1,840	2,470	152,000	85,776	156,000	14,100
Apr.	1.36	4.75	8	4,040	25	234	1,370	81,700	74,537	125,000	29,300
May	3.26	.92	26	4,420	1	1,180	3,070	189,000	73,649	189,000	4,510
June	2.67	3.69	17	4,930	30	336	3,600	214,000	77,663	218,000	1,500
July	1.77	.76	28	2,080	5	314	1,240	76,000	75,696	161,000	10,000
Aug.	2.23	1.73	12	2,540	29	734	1,870	115,000	80,717	157,000	19,100
Sept.	4.41	3.36	10	1,770	19	572	1,340	79,700	62,766	156,000	8,020
Oct.	2.37	7.80	25	1,470	5	56.0	674	41,400	62,975	131,000	21,400
Nov.	1.22	1.41	29	1,900	11	378	1,160	69,200	63,792	128,000	11,500
Dec.	1.52	.07	27	2,350	25	534	1,660	102,000	52,776	124,000	10,400
Yearly	24.28	25.02		4,930		56.0	2,010	1,454,000	825,547	1,489,800	472,500

† And other days Ø Mean daily ⊕ Period 1938-1954 ** Lower Rio Grande Valley area on United States side from Rio Grande City to the Gulf of Mexico.

DIVERSIONS FROM THE RIO GRANDE
ANZALDUAS CANAL NEAR REYNOSA, TAMAULIPAS

DESCRIPTION: Water-stage recorder and cable with stand-up cable car located .5 mile below the canal intake. The zero of the gage is 86.32 feet above mean sea level, U.S.C. & G.S. datum. This canal diverts water from the Rio Grande at a point 12.2 river miles above the international bridge between Hidalgo, Texas and Reynosa, Tamaulipas, 1,072.6 river miles below the American Dam at El Paso, Texas, and 168.8 river miles upstream from the Gulf of Mexico.

RECORDS: Based on 190 meter measurements during the year, 178 by the Mexican and 12 by the United States Section of this Commission, and a continuous record of gage heights. Computations by shifting channel methods. Records available: 1952 through December 1954.

REMARKS: Diversions from the Rio Grande into this canal began May 26, 1952. The recorder began operating December 31, 1953. Flow at this station was affected by backwater from the operation of canal gates 4.5, 11.3, and 22.5 miles below this station. Of the water tabulated below, 94,550 acre-feet were returned to the Rio Grande through the Poniente Drain, near Reynosa (see page 49 in this bulletin). After July 1953, diversion into this canal was facilitated by an earth and rock dam, with crest at elevation 98.13, placed in the Rio Grande just below this canal intake. This diversion was for irrigation and domestic use in Mexico and for conveying water for storage in Culebrón, Palito Blanco, and Villa Cárdenas reservoirs, about 23 canal miles below this station. In 1954, there were 287,248 acres irrigated under this canal system.

EXTREME FLOWS FROM RECORDS: (Last 3 years.) Momentary: Max. 7,560 second-feet on September 5, 1953, with a gage height of 15.58 feet. Zero flow occurred frequently, with a gage height of zero foot.

Average Flow in Second-Feet

Daily:	Max.	5,470	Sept. 5, 1953	Min.	0	Frequently
Monthly:	Max.	2,360	Feb. 1954	Min.	0	Several months
Yearly:	Max.	1,030	1954	Min.	150	1952

Mean Daily Discharge in Second-Feet 1954 — Annual and Period Summary

Day	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	756	586	1,440	2,820	614	2,900	4,030	0	406	0	123	47.3
2	819	600	1,150	*2,630	0	2,950	3,120	0	* 371	0	119	47.3
3	960	724	1,370	*2,700	0	3,090	3,010	0	* 350	0	92.5	35.0
4	1,060	731	1,330	*2,530	0	3,330	2,940	0	336	0	65.7	32.5
5	1,220	727	1,480	*1,850	0	3,200	2,800	0	452	491	58.6	24.4
6	1,270	727	2,000	*1,350	0	2,670	2,450	0	766	2,070	36.4	23.0
7	1,480	1,140	*1,800	2,010	0	* 2,740	664	0	653	1,710	41.7	26.5
8	1,790	1,890	*1,420	1,970	0	* 2,520	0	0	936	554	44.1	32.5
9	1,870	2,370	*1,400	2,210	0	2,190	0	0	869	819	42.7	23.0
10	2,060	2,010	1,860	3,920	272	* 1,550	0	136	901	943	278	27.9
11	2,440	1,800	*1,880	3,920	262	* 1,610	0	1,410	780	1,130	2,660	33.5
12	2,450	2,060	*2,400	3,780	180	1,590	0	1,730	1,290	777	2,270	20.8
13	2,280	1,970	*2,750	1,870	628	1,480	0	1,690	1,210	558	60.0	23.0
14	2,190	1,790	*2,690	830	671	1,510	0	1,710	*1,120	826	41.3	26.5
15	2,380	2,080	*2,490	480	385	1,470	58.3	1,730	*1,040	275	41.7	23.0
16	2,650	2,190	*2,380	272	388	1,510	107	1,750	* 396	178	41.3	49.4
17	3,270	2,610	*2,370	188	341	* 1,340	108	1,570	31.1	323	139	72.7
18	3,810	3,510	*2,200	191	385	1,260	109	294	0	303	53.7	36.7
19	3,670	3,370	*1,970	299	406	657	111	0	63.2	53.0	53.7	33.5
20	2,730	3,320	*1,430	248	953	770	119	0	41.3	100	53.7	u 10.6
21	1,420	3,570	*1,550	195	2,400	731	136	0	23.7	155	52.3	u 10.6
22	1,770	3,600	*1,080	159	2,060	* 632	137	134	0	183	52.6	u 10.6
23	17.7	3,780	1,270	70.6	2,580	* 632	130	431	0	646	54.0	u 10.6
24	17.7	3,850	1,210	0	3,270	516	125	378	0	1,360	53.3	u 10.6
25	17.6	3,850	1,220	0	3,570	735	120	350	0	1,400	50.5	u 10.6
26	17.6	3,880	1,230	0	3,640	1,930	120	360	0	576	50.5	99.6
27	35.3	3,850	1,100	0	3,602	3,190	120	360	0	171	47.7	121
28	35.3	3,390	1,220	604	3,430	1,590	42.0	342	258	209	47.0	38.5
29	35.3		2,280	1,140	3,520	664	0	452	0	252	47.3	u 10.6
30	35.3		2,910	1,150	* 3,570	4,590	0	964	0	155	51.2	u 10.6
31	371		2,950		3,480		0	* 420		134		u 10.6
Sum	44,927.8	65,975	*55,830	*39,386.6	40,607	55,547	20,556.3	16,211	12,293.3	16,351.0	6,822.5	993.0

Month	1952-1954 Average Rainfall Inches **		Current Year 1954 Extreme Second-Feet High Day	High	Low Day	Low	Average Second-Feet	Total Acre-Feet	Period 1952-1954 Acre-Feet Average	Maximum	Minimum
Jan.	.23	.14	19	3,990	†25	17.6	1,450	89,110	29,703	89,110	0
Feb.	.43	.16	27	4,030	1	431	2,360	130,900	43,633	130,900	0
Mar.	.36	.31	29	3,250	† 1	586	*1,800	* 110,700	* 37,219	* 110,700	0
Apr.	1.73	4.06	10	5,470	†23	0	*1,310	* 78,120	* 26,837	* 78,120	0
May	1.44	.97	26	4,100	† 2	0	1,310	80,540	37,947	80,540	379
June	2.59	3.79	30	5,440	29	0	1,850	110,200	42,353	110,200	0
July	1.50	.60	1	4,520	†28	0	663	40,770	33,306	58,830	318
Aug.	2.11	1.65	12	1,840	† 1	0	523	32,150	23,829	38,770	566
Sept.	2.58	4.03	12	1,700	†21	0	410	24,380	48,295	120,400	106
Oct.	3.56	6.17	7	2,770	† 1	0	527	32,430	37,870	81,180	0
Nov.	1.19	.96	11	3,600	† 6	35.3	227	13,530	20,333	47,470	0
Dec.	.39	.06	26	339	†20	u 10.6	32.0	1,970	25,617	74,880	0
Yearly	18.11	22.90		5,470		0	1,030	# 744,800	406,942	744,800	109,282

u Estimated * Partly estimated (Affected by backwater) † And other days ** Mean rainfall Control (C1K-9) to Matamoros
Includes a total of 94,550 acre-feet returned to the Rio Grande through the Reynosa Poniente Drain, located 4.5 miles below this station, during various days of the months of January, April, and May 1954.

MUNICIPAL WATER USES

In Acre-Feet

Tabulated below are yearly and monthly amounts of water pumped from the Rio Grande, or tributaries, into the municipal distribution systems of several cities along the border. The basic data are furnished by the municipalities. During 1954, the City of El Paso pumped a total of 7,061 acre-feet of water from wells near Canutillo, Texas, into the Rio Grande. The total monthly amounts of water diverted from the river by the City of El Paso are shown below. The Del Rio water came from San Felipe Springs. The Guerrero water came from Falcón Reservoir. All other diversions are from the Rio Grande; the City of Brownsville diversions, however, is included as a portion of a measured diversion from the river included with "Diversions from the Rio Grande - United States Side below Rio Grande City, Texas." Because of changing conditions, the period records are limited here to the past ten years.

The population figures for Mexico are estimates furnished by the respective municipalities. Population figures for United States cities are estimates made by the Chamber of Commerce in each city, except for El Paso, where the estimate was made by the El Paso Herald-Post newspaper, and Falcón Village, which was estimated by the International Boundary and Water Commission.

In the United States

Month	EL PASO (Pop. 185,000)				DEL RIO (Pop. 21,500) ∅				EAGLE PASS (Pop. 10,500)			
	1954	Period 1945-1954			1954	Period 1945-1954			1954	Period 1945-1954		
		Average	Maximum	Minimum		Average	Maximum	Minimum		Average	Maximum	Minimum
Jan.	690	350.7	963.2	0	224.1	147.9	224.1	87.5	68.5	66.9	89.3	44.9
Feb.	0	376.4	843.0	0	283.9	155.4	283.9	ᵘ 90.0	77.1	65.8	90.6	52.1
Mar.	28.8	436.1	1,016.2	28.8	351.6	203.1	351.6	129.1	99.9	84.0	101.0	67.5
Apr.	400	523.9	1,016.5	28.5	282.6	217.6	348.8	ᵘ 135.0	86.6	83.5	117.8	64.5
May	912	650.9	1,103.7	43.0	320.8	261.2	422.9	199.1	117.3	89.8	148.4	55.0
June	1,277	866.4	1,277.0	519.9	347.2	308.4	531.6	ᵘ 200.0	122.4	103.9	173.4	40.0
July	1,187	872.8	1,187.0	538.1	459.8	341.9	606.5	218.7	164.1	126.0	196.5	95.6
Aug.	897	858.3	1,139.0	514.4	518.2	342.8	518.2	207.9	142.5	115.3	178.4	75.4
Sept.	501	738.7	1,158.0	207.7	487.5	273.1	487.5	ᵘ 210.0	136.2	97.6	146.3	65.2
Oct.	205	631.1	917.9	193.4	262.3	191.5	272.1	84.8	91.6	75.7	107.7	48.4
Nov.	0	452.9	842.7	0	249.0	172.9	249.0	85.4	84.2	66.3	84.2	47.8
Dec.	0	492.7	952.8	0	266.1	160.1	266.1	78.5	87.0	68.1	87.0	55.6
Yearly	6,097.8	7,250.9	11,384.6	4,049.5	4,053.1	2,775.9	4,053.1	1,807.4	1,277.4	1,042.9	1,407.9	771.5

Month	LAREDO (Pop. 59,350)				FALCON VILLAGE (Pop. 146)				‡ ROMA (Pop. 6,286)			
	1954	Period 1945-1954			1954	Period May 1951-1954			1954	Period 1945-1954		
		Average	Maximum	Minimum		Average	Maximum	Minimum		Average	Maximum	Minimum
Jan.	441.7	378.2	446.3	310.5	7.2	4.4	7.2	2.5	13.2	9.2	14.9	4.4
Feb.	501.2	369.8	501.2	297.4	7.1	4.3	7.1	2.7	14.8	9.4	14.8	4.6
Mar.	571.0	477.4	571.0	410.7	10.4	5.9	10.4	3.5	18.5	12.0	18.5	7.2
Apr.	565.3	516.0	643.4	386.0	4.3	4.5	4.9	4.3	17.3	12.4	19.8	6.9
May	647.6	562.1	699.8	384.8	4.9	4.0	4.9	3.1	18.7	13.9	20.5	6.8
June	662.1	585.1	662.1	413.8	5.5	4.8	6.3	2.9	21.5	14.6	21.5	8.0
July	591.7	665.5	818.6	591.7	6.5	6.8	7.3	6.5	22.5	15.4	22.5	8.9
Aug.	811.1	682.4	818.4	474.1	8.4	7.7	9.2	5.8	22.8	15.0	22.8	7.9
Sept.	618.3	552.4	668.6	389.0	4.9	5.2	8.2	2.8	19.8	13.3	19.8	7.4
Oct.	520.9	487.7	590.7	404.8	3.1	4.5	6.8	3.1	16.8	11.9	17.5	6.1
Nov.	503.4	417.9	503.4	353.1	3.2	3.1	3.4	2.5	15.8	10.4	15.8	6.8
Dec.	504.2	384.4	504.2	292.4	3.8	3.0	3.8	2.6	17.1	10.1	17.1	5.5
Yearly	6,938.5	6,078.9	6,938.5	5,237.9	69.3	58.2	69.3	51.9	218.8	147.6	218.8	86.7

Month	RIO GRANDE CITY (Pop. 6,000)				BROWNSVILLE (Pop. 41,000)			
	1954	Period 1945-1954			1954	Period 1945-1954		
		Average	Maximum	Minimum		Average	Maximum	Minimum
Jan.	37.3	32.9	54.2	14.7	458.6	395.2	590.8	130.4
Feb.	40.9	33.3	56.5	14.8	504.0	373.2	520.4	147.2
Mar.	44.0	37.5	55.9	20.0	568.1	416.3	619.0	193.5
Apr.	44.3	40.0	57.4	18.8	536.4	426.9	617.1	196.2
May	42.8	45.0	76.0	28.9	662.4	454.8	699.7	205.9
June	51.3	43.4	64.1	27.4	637.5	448.2	711.7	108.7
July	51.9	51.7	79.0	31.7	645.8	508.3	830.5	0
Aug.	50.1	51.4	70.4	30.9	671.6	489.2	763.4	65.4
Sept.	28.4	44.2	69.6	28.4	481.2	467.0	645.8	178.4
Oct.	30.3	41.4	62.1	23.9	394.7	428.3	569.2	155.8
Nov.	30.6	36.5	51.7	25.9	396.8	394.3	491.0	191.0
Dec.	36.5	36.9	67.9	22.3	443.1	402.4	514.5	215.4
Yearly	488.4	494.2	687.4	293.4	6,400.2	5,204.1	7,180.8	2,225.4

In Mexico

Month	NUEVO LAREDO (Pop. 72,000)				N.CD.GUERRERO (Pop. 3,000)				REYNOSA (Pop. 40,000)	MATAMOROS (Pop. 71,700)			
	1954	Period 1945-1954			1954	Period Nov. 1953-1954			1954	1954	Period 1945-1954		
		Average	Max.	Min.		Avg.	Max.	Min.			Avg.	Max.	Min.
Jan.	408.0	274.8	408.0	157.4	20.2				52.7	241.4	137.9	261.2	72.1
Feb.	391.6	264.8	391.6	148.6	18.4				54.3	229.7	122.4	230.6	64.0
Mar.	505.0	332.0	505.0	206.6	21.2				57.6	264.2	144.4	264.2	80.9
Apr.	522.5	346.7	522.5	210.5	22.3				58.4	304.5	144.6	304.5	82.5
May	575.1	378.3	575.1	269.2	26.8				61.6	325.3	150.3	325.3	90.0
June	595.1	380.0	595.1	268.8	28.1				61.6	315.2	142.7	315.2	84.3
July	584.8	409.2	584.8	265.9	31.1				61.6	325.2	147.0	325.2	90.5
Aug.	628.0	420.8	628.0	290.3	31.5				61.6	325.2	149.3	325.2	85.9
Sept.	619.1	377.4	619.1	262.4	28.7				58.4	315.2	156.8	315.2	82.9
Oct.	513.3	353.5	513.3	215.4	29.3				55.1	325.7	165.9	325.7	78.5
Nov.	441.8	315.1	441.8	207.9	28.8	23.9	28.8	19.0	54.3	298.3	147.4	298.3	77.2
Dec.	458.7	305.2	458.7	197.4	28.9	24.8	28.9	20.8	52.7	303.1	147.8	303.1	74.8
Yearly	6,243.0	4,157.8	6,243.0	2,715.9	315.3				689.9	3,573.0	1,756.5	3,573.0	996.8

ᵘ Estimated ∅ Includes Laughlin Air Base ‡ Includes Los Saenz and Escobares, Texas and Cd. Miguel Alemán, Tamaulipas.

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES

At each station, during each month of sampling, several water samples were taken by one or more of the four following methods:

A. By lowering an open small-necked bottle in one or more verticals in the stream cross section, being careful to approach but not to strike bottom, thus securing an integrated sample at all depths. A monthly composite sample was later made by using, from each sample, a quantity proportional to the river flow volume represented by each sample. The gravimetric percentage of silt in this composite represented the silt in the monthly river flow.

B. By obtaining one depth-integrated sample with a U.S.-D43 sampler at each of three verticals, spaced at 1/6, 1/2, and 5/6 of the stream width. The gravimetric percentage of silt for each measurement was computed by weighting the percentage of silt represented by each of the three samples by the partial flow in its section of the stream. These measurements were plotted on the station gage-height hydrograph from which a silt concentration graph was then drawn between plotted points. From this graph, mean daily silt concentrations were then determined.

C. By sampling at the stream surface with a separate bottle at each of three points, spaced 1/6, 1/2, and 5/6 of the stream width. A coefficient of 1.10 was applied to the average gravimetric percentage of silt in the three bottles and this product was applied to the volume of streamflow represented by that set of samples.

D. A daily composite sample was obtained by sampling at 8-hour intervals the water pumped directly from the river to the Nuevo Laredo water treatment plant. A monthly composite sample was later made by using from each sample a quantity proportional to the river flow volume represented by each sample. The gravimetric percentage of silt in this composite represented that in the monthly river flow.

For ease of comparison, the assumption is made that one cubic foot of silt weighs 66.7 pounds, or one acre-foot of silt weighs 1,452 tons.

At Lower Presidio, Johnson Ranch, and Agua Verde stations, three independent sets of samples were taken, two by method A and one by method B. The results by method A show much greater consistency among themselves than exists between them and method B.

Month	1954						Period of Record		
	Tons		Number of Samples	Gravimetric Percentages			Acre-Feet at 1,452 Tons Per Acre Foot		
	Water	Silt		Average	Maximum Sample	Minimum Sample	Average	Maximum	Minimum

Rio Grande at El Paso, Texas — Period September 1948-1954

Jan.	4,414,000	133	31	.003017			.09	.38	1.4	.04
Feb.	2,730,000	18.0	28	.0006604			.01	.55	2.2	.01
Mar.	7,427,000	1,750	31	.02353			1.2	13.5	33.7	1.2
Apr.	30,830,000	5,520	30	.01792			3.8	21.3	45.2	3.8
May	17,322,000	7,820	30	.04517			5.4	16.7	63.3	1.9
June	16,964,000	6,650	30	.03919			4.6	39.3	152	4.6
July	21,998,000	1,610	20	.007321			1.1	43.5	124	1.1
Aug.	15,891,000	96,800	31	.6092			66.7	39.9	66.7	11.9
Sept.	3,298,000	2,670	30	.08108			1.8	21.3	92.3	1.7
Oct.	5,151,000	54,100	31	1.0500			37.3	7.0	37.3	.19
Nov.	734,000	78.3	30	.01067			.05	.54	1.5	.05
Dec.	592,000	62.0	31	.01048			.04	.48	2.1	.04
Yearly	127,351,000	177,211.3	353	.1392			122.09	204.45	436.87	76.94

Samples and Analyses by U.S. Section, Method A

Río Conchos at Cuchillo Parado, Chihuahua — Period 1945-1954

Jan.	15,983,000	0	13	0	0	0	0	0	0	0
Feb.	16,735,000	0	12	0	0	0	0	.51	4.0	0
Mar.	9,512,000	0	14	0	0	0	0	.30	3.0	0
Apr.	3,071,000	0	14	0	0	0	0	0	0	0
May	1,786,000	107	13	.0060	.0360	0	.07	5.3	28.2	0
June	3,672,000	1,890	14	.0516	.2903	0	1.3	86.4	676	0
July	25,469,000	9,910	13	.0389	.0949	0	6.8	466	1,820	0
Aug.	174,078,000	3,358,000	18	1.9288	3.0139	0	2,310	433	2,310	.79
Sept.	66,626,000	241,000	13	.3614	1.5941	0	166	333	1,190	.32
Oct.	38,524,000	105,000	13	.2738	.4594	0	72.3	188	997	0
Nov.	22,191,000	0	13	0	0	0	0	.38	3.6	0
Dec.	16,940,000	0	3	0	0	0	0	.08	.83	0
Yearly	394,587,000	3,715,907	153	.9417	3.0139	0	2,556.47	1,512.97	2,590.4	119.9

Samples and Analyses by Mexican Section, Method C

Rio Grande at Lower Presidio Station — Period October 1949-1954

Jan.	15,772,000	978	12	.0062	.0111	.0023	.67	3.5	10.3	.67
Feb.	14,495,000	1,070	11	.0074	.0127	.0014	.74	4.8	13.0	.15
Mar.	7,340,000	433	9	.0059	.0197	.0005	.30	4.6	14.6	.28
Apr.	1,704,000	402	10	.0236	.0234	.0070	.28	1.3	2.5	.07
May	5,592,000	49,900	10	.8930	1.6081	.0144	34.4	10.9	34.4	.98
June	9,798,000	27,200	7	.2777	.4902	.0135	18.7	131	510	1.3
July	26,114,000	254,000	9	.9732	2.4691	.0168	175	688	1,810	112
Aug.	215,315,000	3,040,000	10	1.4121	2.3496	.0106	2,090	549	2,090	3.3
Sept.	75,077,000	226,000	9	.3004	.6713	.0088	156	353	1,440	5.8
Oct.	51,552,000	143,000	8	.2783	.5075	.0076	98.5	119	509	1.0
Nov.	21,404,000	2,680	9	.0125	.0177	.0074	1.8	4.8	13.1	.45
Dec.	16,320,000	1,710	9	.0105	.0135	.0061	1.2	2.7	7.6	.53
Yearly	460,483,000	3,747,373	113	.8138	2.4691	.0005	2,577.59	1,872.6	3,780.9	188.60

Samples and Analyses by U.S. Section, Method B (Compare with Method A, Page 74)

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES

Rio Grande at Johnson Ranch, Texas—1949

Record not previously published

Month	1954 Tons Water	1954 Tons Silt	1954 Number of Samples	1954 Gravimetric Percentages Average	Maximum Sample	Minimum Sample	1954 Acre-Feet at 1,452 Tons Per Acre Foot	Period of Record Average	Maximum	Minimum
Jan.										
Feb.										
Mar.										
Apr.										
May										
June										
July										
Aug.										
Sept.										
Oct.	145,418,000	811,000	14	.5574	3.9362	.0326	559			
Nov.	107,218,000	83,300	15	.0777	.1157	.00402	57.4			
Dec.	80,687,000	14,400	12	.0178	.0306	.00723	9.9			
Yearly			41							

Samples and Analyses by U.S. Section, Method B

Rio Grande at Johnson Ranch, Texas —1950

Record not previously published

Jan.	86,078,000	21,300	10	.0248	.0469	.00532	14.7			
Feb.	74,627,000	25,000	5	.0335	.0812	.0173	17.2			
Mar.	71,064,000	21,000	2	.0296	.0207	.00625	14.5			
Apr.	23,954,000	47,100	7	.1966	1.3237	.00323	32.4			
May	27,240,000	33,400	9	.1227	.9043	.0108	23.0			
June	95,629,000	1,439,000	16	1.5046	6.9722	.1092	991			
July	201,494,000	4,454,000	15	2.2107	4.8365	.0340	3,070			
Aug.	156,969,000	2,848,000	14	1.8144	3.6039	.0310	1,960			
Sept.	222,801,000	5,847,000	10	2.6245	2.5350	.1020	4,030			
Oct.	164,323,000	1,234,000	16	.7510	1.6331	.0257	850			
Nov.	69,654,000	24,900	5	.0358	.0551	.0143	17.1			
Dec.	64,473,000	13,300	4	.0206	.0249	.0175	9.2			
Yearly	1,258,306,000	16,008,000	113	1.2722	6.9722	.00323	11,029.1			

Samples and Analyses by U.S. Section, Method B

Rio Grande at Johnson Ranch, Texas

Period October 1949-1954

Jan.	15,392,000	1,510	13	.0098	.0146	.0044	1.0	5.0	14.7	1.0
Feb.	12,861,000	1,140	12	.0089	.0134	.0062	.79	7.1	17.2	.79
Mar.	6,029,000	452	14	.0075	.0116	.0002	.31	8.4	20.3	.31
Apr.	27,588,000	650,000	9	2.3569	3.2232	.0000	448	118	448	.12
May	15,736,000	208,000	14	1.3247	4.3067	.0052	143	96.5	236	0
June	58,098,000	1,379,000	16	2.3740	5.3643	.0097	950	720	1,330	20.7
July	27,234,000	227,000	14	.8317	3.4185	.0078	156	1,853	4,920	156
Aug.	271,499,000	6,888,000	16	2.5372	4.1431	.0081	4,740	1,420	4,740	3.4
Sept.	85,070,000	424,000	15	.4989	1.1453	.0181	292	1,000	4,030	58.3
Oct.	55,803,000	581,000	6	1.0406	3.3487	.0159	400	311	850	1.4
Nov.	22,242,000							16.2	57.4	.41
Dec.	17,611,000	1,140	13	.0065	.0118	.0033	.79	8.0	25.3	.79
Yearly	615,163,000		142					5,563.2		767.75

Samples and Analyses by U.S. Section, Method B (Compare with Method A, Page 74)

Rio Grande at Agua Verde Station

Period 1953-1954

Jan.	28,369,000	1,670	4	.0059	.0101	.0026	1.2	1.4	1.6	1.2
Feb.	25,517,000	1,990	4	.0078	.0095	.0056	1.4	.80	1.4	.20
Mar.	20,945,000	3,350	5	.0160	.0210	.0096	2.3	8.6	14.9	2.3
Apr.	58,421,000	1,100,000	3	1.8828	.8932	.0347	758	380	758	1.3
May	63,432,000	1,290,000	4	2.0342	2.6408	.0093	888	445	888	1.1
June	111,323,000	2,364,000	10	2.1235	2.5856	.0317	1,630	816	1,630	1.8
July	48,959,000	316,000	3	.6462	1.3709	.1689	218	256	294	218
Aug.	289,325,000	5,806,000	4	2.0069	2.1956	.0122	4,000	2,032	4,000	63.9
Sept.	117,367,000	709,000	6	.6041	1.1238	.0275	488	417	488	346
Oct.	69,115,000	167,000	4	.2417	.4927	.0256	115	82.2	115	49.4
Nov.	37,084,000	4,040	4	.0109	.0125	.0088	2.8	4.0	5.3	2.8
Dec.	33,914,000	2,880	5	.0085	.0098	.0068	2.0	1.8	2.0	1.5
Yearly	903,771,000	11,765,930	56	1.3019	2.6408	.0026	8,106.7	4,444.8	8,106.7	781.00

Samples and Analyses by U.S. Section, Method B (Compare with Method A, Page 74)

Rio Grande at Langtry, Texas

Period April 1944-1954

Jan.	37,041,000	2,220	10	.005992			1.5	5.7	11.4	.94
Feb.	33,998,000	1,270	11	.003750			.87	7.5	36.9	.87
Mar.	31,628,000	777	12	.002456			.54	7.8	27.0	.54
Apr.	152,144,000	892,000	14	.5862			614	71.8	614	1.1
May	100,783,000	1,233,000	11	1.2238			849	191	849	.95
June	350,751,000	3,563,000	14	1.0157			2,450	597	2,450	.91
July	62,572,000	190,000	8	.3040			131	1,520	5,780	60.9
Aug.	295,296,000	5,663,000	11	1.9177			3,900	1,080	3,900	4.7
Sept.	134,862,000	526,000	5	.3902			362	1,270	3,280	1.0
Oct.	81,528,000	131,000	6	.1603			90.2	723	3,261	5.1
Nov.	43,099,000	4,650	5	.0108			3.2	26.4	88.2	1.3
Dec.	40,322,000	1,120	8	.002789			.77	9.1	46.8	.18
Yearly	1,364,024,000	12,208,037	115	.8950			8,403.08	5,509.3	8,747.7	645.10

Samples and Analyses by U.S. Section, Method A

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES

Pecos River near Comstock, Texas

Period June 1943-June 1954

Month	1954 Tons Water	1954 Tons Silt	1954 Number of Samples	1954 Gravimetric Percentages Average	1954 Gravimetric Percentages Maximum Sample	1954 Gravimetric Percentages Minimum Sample	Period of Record Acre-Feet at 1,452 Tons Per Acre Foot Average	Maximum	Minimum
Jan.	12,513,000	246	6	.001967			.17	.45	.96	.15
Feb.	10,597,000	19.9	4	.0001878			.01	.66	2.1	.01
Mar.	11,839,000	59.2	9	.0005000			.04	.63	1.4	.04
Apr.	99,945,000	189,000	12	.1890			130	16.1	130	.19
May	63,065,000	109,000	4	.1721			75.1	11.6	75.1	.40
June [a]	2,385,820,000	6,337,000	5	.2656			4,360			.16
July										
Aug.										
Sept.										
Oct.										
Nov.										
Dec.										
Yearly										

Samples and Analyses by U.S. Section, Method A . The interruption of silt sampling at this station was due to the flood of late June and early July 1954.

Pecos River near Mouth

Jan.										
Feb.										
Mar.										
Apr.										
May										
June										
July										
Aug.	30,213,000	327	4	.001083			.23			
Sept.	20,460,000	32.9	5	.0001606			.02			
Oct.	23,177,000	2,120	4	.009128			1.5			
Nov.										
Dec.										
Yearly										

Samples and Analyses by U.S. Section, Method A

Pecos River near Shumla, Texas

Jan.										
Feb.										
Mar.										
Apr.										
May										
June										
July										
Aug.										
Sept.										
Oct.										
Nov.	16,619,000	499	4	.003005			.34			
Dec.	16,640,000	213	5	.001283			.15			
Yearly										

Samples and Analyses by U.S. Section, Method A

Rio Grande at Eagle Pass, Texas

Period 1934-1954

Jan.	63,855,000	5,530	26	.008667			3.8	19.9	124	.07
Feb.	56,356,000	11,600	24	.02065			8.0	49.9	768	2.6
Mar.	36,653,000	6,300	27	.01720			4.3	24.8	188	3.8
Apr.	297,592,000	1,336,000	25	.4489			920	107	920	3.0
May	284,669,000	1,093,000	26	.3838			753	517	4,220	1.9
June [b]	468,294,000	2,549,000	24	.5443			1,760			.59
July [c]	44,694,000	1,020	7	.002276			.70			12.0
Aug.	356,396,000	2,103,000	24	.5901			1,450	1,034	5,310	14.8
Sept.	241,910,000	1,251,000	22	.5170			862	2,384	10,800	7.0
Oct.	268,220,000	760,000	26	.2833			523	950	5,820	3.7
Nov.	123,651,000	26,500	25	.0214			18.3	103	562	4.4
Dec.	108,016,000	7,720	26	.007149			5.3	21.4	84.1	1.1
Yearly			282							1,633.2

Samples by Mexican Section and Analyses by U.S. Section, Method A

Rio Grande at Laredo, Texas

Jan.	74,889,000	11,300	6	.01515			7.8			
Feb.	62,197,000	3,270	7	.005263			2.3			
Mar.	42,077,000	1,190	9	.002826			.82			
Apr.	327,245,000	529,000	10	.1617			364			
May	387,534,000	959,000	6	.2474			660			
June [d]	347,891,000	1,114,000	9	.3203			767			
July [e]	890,814,000									
Aug.	386,264,000	1,993,000	12	.5159			1,370			
Sept.	343,187,000	1,061,000	7	.3092			731			
Oct.	339,764,000	382,000	13	.1125			263			
Nov.	150,931,000	19,000	30	.01262			13.1			
Dec.	142,682,000	8,320	30	.005833			5.7			
Yearly			139							

Samples by Mexican Section and Analyses by U.S. Section, Method A, January to October; Method D, November and December
Some months missing [a] No samples collected June 27 and 28 when highest flow occurred for the month. [b] Composite for June 1 to 26, inclusive. [c] Composite for July 24 to 31, inclusive. [d] Composite for June 1 to 18, inclusive. An estimated 18,000,000 tons of silt passed this station in June. [e] An estimated 5,000,000 tons of silt passed this station in July.

SUSPENDED SILT IN THE RIO GRANDE AND SOME TRIBUTARIES

Río Alamo at Cd. Mier, Tamaulipas

Period 1934-1954

Month	1954 Tons Water	1954 Tons Silt	1954 Number of Samples	1954 Gravimetric Percentages Average	Maximum Sample	Minimum Sample	1954 Acre-Feet at 1,452 Tons Per Acre Foot	Period of Record Average	Maximum	Minimum
Jan.	436,000	u 0	0	u0			u 0	2.3	21.8	0
Feb.	12,100	u 0	0	u0			u 0	.34	6.6	0
Mar.	0	0	0	0	0	0	0	8.2	91.6	0
Apr.	42,161,000	262,000	2	.622	.745	0	180	32.4	227	0
May	11,354,000	15,100	1	.133	.181	0	10.4	43.7	230	0
June	1,882,000	2,790	1	.148	.198	0	1.9	66.0	471	0
July	154,000	u 0	0	u0			u 0	17.4	92.8	0
Aug.	100,000	u 0	0	u0			u 0	198	1,610	0
Sept.	877,000	u 0	0	u0			u 0	247	2,920	u 0
Oct.	8,202,000	16,800	3	.205	.308	0	11.6	83.7	558	0
Nov.	1,934,000	u 0	0	u0			u 0	1.0	u 5.4	0
Dec.	115,000	u 0	0	u0			u 0	1.1	16.1	0
Yearly	67,227,100	296,690	7	.441	.745	0	203.9	701.14	3,156.57	126.7

Samples and Analyses by Mexican Section, Method C

Rio Grande at Roma, Texas *

Month	1954 Tons Water	1954 Tons Silt	1954 Number of Samples	1954 Gravimetric Percentages Average	Maximum Sample	Minimum Sample	1954 Acre-Feet at 1,452 Tons Per Acre Foot	Period of Record Average	Maximum	Minimum
Jan.	266,977,000	22,200	30	.008313			15.3			
Feb.	401,575,000	43,000	19	.01072			29.6			
Mar.	368,392,000	7,670	4	.002081			5.3			
Apr.	192,375,000									
May	412,520,000	355,000	4	.08595			244			
June	471,388,000	54,100	5	.01147			37.3			
July	133,684,000	134,000	4	.1002			92.3			
Aug.	196,272,000	196	4	.0001			.13			
Sept.	141,558,000	13,000	5	.009182			9.0			
Oct.	63,297,000	1,290	4	.002035			.89			
Nov.	93,213,000	72,100	3	.0774			49.7			
Dec.	144,332,000	1,690	4	.001173			1.2			
Yearly	2,885,583,000		86							

Samples by Mexican Section and Analyses by U.S. Section, Method A

Rio Grande at Lower Presidio Station

Period October 1951-1954

Month	1954 Tons Water	1954 Tons Silt Samples Set No. 1	1954 Tons Silt Samples Set No. 2	1954 Number of Samples	1954 Gravimetric Percentages Samples Set No. 1	Samples Set No. 2	Average of Sets #1 & #2	Period of Record Acre-Feet at 1,452 Tons Per Acre Foot Average	Maximum	Minimum
Jan.	15,772,000	978	789	24	.0062	.0050	.61	.36	.61	.17
Feb.	14,495,000	1,120	1,220	22	.0077	.008a	.81	.50	.81	.15
Mar.	7,340,000	213	374	18	.0029	.0051	.20	.56	1.2	.20
Apr.	1,704,000	409	322	20	.0240	.0189	.25	2.1	6.1	.09
May	5,592,000	58,000	62,600	20	1.0370	1.1196	41.5	15.1	41.5	.87
June	9,798,000	7,670	8,290	14	.0783	.0846	5.5	150	415	5.5
July	26,114,000	270,000	288,000	18	1.0353	1.1032	192	746	1,900	145
Aug.	215,315,000	2,960,000	3,049,000	18	1.3748	1.4160	2,070	723	2,070	4.5
Sept.	75,077,000	228,000	239,000	18	.3031	.3177	161	95.9	161	32.3
Oct.	51,552,000	162,000	158,000	16	.3140	.3057	110	28.9	110	1.0
Nov.	21,404,000	3,100	3,320	18	.0145	.0155	2.2	1.4	2.2	.70
Dec.	16,320,000	1,130	963	18	.0069	.0059	.72	.88	1.3	.62
Yearly	460,483,000	3,692,620	3,811,878	224	.8019	.8278	2,584.79	1,764.70	2,584.79	308.94

Samples and Analyses by U.S. Section, Method A (Compare with Method B, Page 71)

Rio Grande at Johnson Ranch, Texas

Period October 1951-1954

Month	1954 Tons Water	1954 Tons Silt Samples Set No. 1	1954 Tons Silt Samples Set No. 2	1954 Number of Samples	1954 Gravimetric Percentages Samples Set No. 1	Samples Set No. 2	Average of Sets #1 & #2	Period of Record Acre-Feet at 1,452 Tons Per Acre Foot Average	Maximum	Minimum
Jan.	15,392,000	1,370	1,710	26	.0089	.0111	1.1	.95	1.1	.84
Feb.	12,861,000	810	1,140	24	.0063	.0089	.67	.80	1.0	.67
Mar.	6,029,000	392	295	28	.0065	.0049	.24	1.6	4.3	.20
Apr.	27,588,000	1,000,000	1,009,000	24	3.6261	3.6580	692	287	692	.08
May	15,736,000	441,000	442,000	28	2.8034	2.8117	304	201	304	0
June	58,098,000	1,709,000	1,596,000	32	2.9411	2.7465	1,140	914	1,570	31.6
July	27,234,000	258,000	271,000	28	.9474	.9938	182	1,626	4,030	182
Aug.	271,499,000	5,476,000	5,661,000	26	2.0171	2.0850	3,840	1,331	3,840	2.8
Sept.	85,070,000	447,000	472,000	30	.5254	.5547	316	242	316	98.5
Oct.	55,803,000	711,000	717,000	12	1.2744	1.2854	492	141	492	2.4
Nov.	22,242,000	2,890	2,310	24	.0130	.0104	1.8	1.2	1.8	.28
Dec.	17,611,000	792	634	26	.0045	.0036	.49	13.4	48.3	.49
Yearly	615,163,000	10,048,254	10,174,089	308	1.6334	1.6539	6,970.30	4,759.95	6,970.30	1,173.81

Samples and Analyses by U.S. Section, Method A (Compare with Method B, Page 72)

Rio Grande at Agua Verde Station

Period 1953-1954

Month	1954 Tons Water	1954 Tons Silt Samples Set No. 1	1954 Tons Silt Samples Set No. 2	1954 Number of Samples	1954 Gravimetric Percentages Samples Set No. 1	Samples Set No. 2	Average of Sets #1 & #2	Period of Record Acre-Feet at 1,452 Tons Per Acre Foot Average	Maximum	Minimum
Jan.	28,369,000	3,460	2,440	8	.0122	.0086	2.0	2.2	2.4	2.0
Feb.	25,517,000	2,420	1,890	8	.0095	.0074	1.5	.82	1.5	.15
Mar.	20,945,000	1,450	1,320	10	.0069	.0063	.95	3.6	6.3	.95
Apr.	58,421,000	331,000	320,000	6	.5660	.5478	224	113	224	2.5
May	63,432,000	1,248,000	1,281,000	8	1.9680	2.0202	871	436	871	.60
June	111,323,000	2,177,000	2,118,000	12	1.9552	1.9027	1,480	740	1,480	.64
July	48,959,000	299,000	290,000	6	.6111	.5924	203	222	240	203
Aug.	289,325,000	7,728,000	7,461,000	8	2.6712	2.8789	5,230	2,670	5,230	109
Sept.	117,367,000	721,000	773,000	12	.6141	.6585	514	371	514	228
Oct.	69,115,000	181,000	185,000	8	.2622	.2674	126	83.9	126	41.8
Nov.	37,084,000	4,150	4,080	8	.0112	.0110	2.8	3.3	3.8	2.8
Dec.	33,914,000	1,250	1,360	10	.0037	.0040	.90	1.2	1.6	.90
Yearly	903,771,000	12,697,730	12,439,090	104	1.4050	1.3764	8,656.15	4,647.02	8,656.15	636.79

Samples and Analyses by U.S. Section, Method A (Compare with Method B, Page 72) u Estimated # Some months missing * Except for tributary inflows below Falcón Dam, flow at this station, after August 25, 1953, was controlled largely by releases from Falcón Reservoir, 21 miles upstream, and intervening diversions. For this reason, the 1954 records have not been combined with those for the period March 1929-1953.

CHEMICAL ANALYSIS OF WATER SAMPLES FROM THE RIO GRANDE AND TRIBUTARIES – 1954

The following chemical analyses are from composites made up periodically from independent water samples composed by taking from each sample an amount of water proportional to the volume of river flow represented by that sample. This compositing and the determination of the electrical conductivity of the individual water samples were done by the United States Section of the International Boundary and Water Commission. The chemical analyses were made by the Rubidoux Laboratory of the U.S. Department of Agriculture at Riverside, California.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: Ca, 20; Mg, 12.16; Na, 23; (CO_3 plus HCO_3), expressed as CO_3, 30.0; SO_4, 48; Cl, 35.5; NO_3, 62. To convert tons per acre-foot to parts per million, multiply tons per acre-foot by 735.5.

Electrical conductivity, reported in the following tables as $ECx10^6$ at 25°C, is a relative measure of the total salt concentration in the water samples.

Month	No. of Samples	Dissolved Solids: Tons Per Acre Foot	Dissolved Solids: Total Tons	Mean $ECx10^6$ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3

Sampling by U.S. Section

Rio Grande at El Paso, Texas

Jan.	31	2.08	6,760	2,310	.34	7.7	65	40	5.59	2.25	15.4	4.75	9.48	9.50	.01
Feb.	28	2.07	4,160	2,320	.43	8.0	70	38	5.01	2.17	16.4	4.75	10.12	8.95	.01
Mar.	31	1.48	8,100	1,690	.24	8.1	58	38	5.19	2.00	9.75	3.45	7.24	6.50	.03
Apr.	30	1.25	28,400	1,420	.21	8.0	54	33	4.76	1.71	7.68	3.20	6.45	4.75	.02
May	30	1.32	16,800	1,430	.22	8.1	58	33	4.26	1.75	8.15	3.25	6.29	4.80	.01
June	30	1.27	15,900	1,440	.07	8.1	57	34	4.41	1.65	8.19	3.20	6.27	4.92	T
July	20	1.23	19,900	1,380	.22	7.8	56	34	4.18	1.66	7.80	3.23	5.99	4.70	T
Aug.	31	.93	10,900	1,090	.22	8.3	55	32	3.60	1.18	5.80	3.00	4.46	3.50	T
Sept.	30	1.74	4,230	2,010	.40	8.2	65	39	5.16	1.98	13.0	3.70	8.65	8.05	T
Oct.	31	1.12	4,240	1,300	.33	8.3	78	44	1.40	1.24	9.37	1.38	5.54	5.35	T
Nov.	30	3.03	1,640	3,390	.47	8.4	75	41	7.08	1.85	26.5	6.05	14.93	14.70	T
Dec.	31	2.86	1,240	3,250	.57	8.5	79	43	4.70	2.07	26.0	5.00	14.09	14.20	T
Mean ⊕	∅ 353	1.30	∅ 122,270	1,470	.22	8.0	59	35	4.35	1.67	8.57	3.25	6.41	5.18	T
Period Average		1.11	567,000	1,220			53	30	4.36	1.61	6.61	3.53	5.43	3.77	
Tons of Constituents, Average Tons Period			1954 1930-1954						11,100 60,900	2,590 13,700	25,100 106,000	12,400 73,800	39,200 182,000	23,400 93,300	

Sampling by U.S. Section

Rio Grande at Fort Quitman, Texas

Jan.	4	10.65	1,760	11,100	.84	7.9	61	73	30.55	15.69	75.0	3.90	29.20	89.12	T
Feb.	4	9.97	1,640	10,600	.93	7.8	65	71	27.12	13.78	75.5	3.50	30.00	83.38	.02
Mar.	5	11.16	1,560	11,700	1.02	8.0	66	71	29.02	15.62	85.0	3.27	34.28	92.40	T
Apr.	5	5.84	724	6,540	.64	7.9	65	68	15.75	8.25	44.4	3.75	17.93	47.10	.03
May	5	2.76	4,550	3,040	.22	7.9	57	69	9.18	3.52	17.0	2.65	6.66	20.55	.04
June	3	2.53	1,480	2,960	.29	8.0	63	64	8.19	2.54	18.1	2.80	7.75	18.48	.04
July	6	1.65	2,050	1,920	.20	7.9	55	55	6.29	2.08	10.4	3.33	5.19	10.55	.02
Aug.	7	.82	7,030	1,010	.23	8.1	57	42	2.98	1.16	5.44	2.80	2.86	4.05	.04
Sept.	5	8.02	866	8,760	.51	7.9	57	75	26.75	14.30	53.8	3.00	20.58	71.38	.01
Oct.	8	1.34	2,720	1,620	.07	7.9	47	63	6.08	2.13	7.22	2.18	3.54	9.80	T
Nov.	4	11.69	790	12,320	.58	8.1	56	77	41.25	19.23	77.7	3.00	28.65	107.1	T
Dec.	5	12.07	521	12,200	.54	8.0	56	76	40.82	20.06	76.3	3.40	30.04	104.2	T
Mean ⊕	∅ 61	1.73	∅ 25,691	1,970	.24	8.0	58	60	5.95	2.41	11.37	2.78	5.10	12.02	.031
Period Average		2.36	463,000	2,680			61	55	7.58	3.09	16.64	3.59	8.75	15.24	
Tons of Constituents, Average Tons Period			1954 1930-1954						2,410 40,500	593 10,000	5,290 102,000	1,690 28,700	4,960 112,000	8,630 144,000	

Sampling by U.S. Section

Rio Grande at Upper Presidio Station

Jan.			No Flow												
Feb.			No Flow												
Mar.			No Flow												
Apr.	1	.48	139	550	.03	8.0	42	18	# 2.76	.34	2.30	2.75	1.66	1.00	.07
May	7	.81	1,340	813			31		# 5.77		2.55	2.75		.70	
June	8	.84	5,340	862			35		# 5.64		3.03	2.75		1.15	
July	3	1.07	3,910	1,070	.17	8.0	35	14	6.40	.78	4.00	2.80	7.03	1.60	.01
Aug.	15	.54	13,000	627			33		# 4.28		2.14	2.50		.75	
Sept.	6	1.81	7,170	2,100			49		# 10.84		10.26	3.40		11.10	
Oct.	5	.62	5,790	727			42		# 4.18		2.98	2.85		1.80	
Nov.	1	3.88	2	4,290			57		# 19.50		25.6	2.70		27.15	
Dec.			No Flow												
Mean ⊕	∅ 46	.743	∅ 36,691	833			38		# 5.22		3.22	2.70		1.89	
Period Average		1.92	358,000	2,180			59		# 8.96		12.98	3.14		11.15	
Tons of Constituents, Average Tons Period			1954 1935-1954								4,970 75,500	5,440 23,800		4,500 100,000	

T Trace ∅ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions # Sum of calcium and magnesium

CHEMICAL ANALYSIS OF WATER SAMPLES FROM THE RIO GRANDE AND TRIBUTARIES – 1954

Month	No. of Samples	Dissolved Solids: Tons Per Acre Foot	Dissolved Solids: Total Tons	Mean EC x 10^6 @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3

Río Conchos at Cuchillo Parado, Chihuahua

Sampling by Mexican Section

Jan.	13	1.40	16,500	1,450	.38	7.9	48	19	6.15	1.77	7.50	3.23	9.32	3.00	.04
Feb.	12	1.38	17,000	1,400			50		# 7.31		7.20	3.15		2.50	
Mar.	13	1.44	10,100	1,510			52		# 7.56		8.05	2.75		3.65	
Apr.	11	1.71	3,860	1,860			54		# 8.56		10.1	2.70		6.35	
May	13	1.66	2,170	1,810			56		# 7.96		10.1	2.50		6.85	
June	14	1.69	4,560	1,790			56		# 7.98		10.0	2.71		5.55	
July	10	1.08	20,200	1,100	.23	8.0	41	15	5.39	1.24	4.78	2.85	6.91	1.75	.04
Aug.	18	.70	89,700	720			24		# 5.77		1.80	2.60		.60	
Sept.	12	.84	41,200	902			41		# 5.47		3.81	3.15		1.45	
Oct.	13	.99	28,100	1,080			48		# 5.77		5.31	3.05		1.90	
Nov.	13	1.27	20,700	1,340			50		# 6.87		6.83	2.55		2.45	
Dec.	3	1.43	17,800	1,470			49		# 7.68		7.52	3.15		2.90	
Mean ⊕ (∯ 145)		.936	∯ 271,890	979			39		# 6.17		3.99	2.83		1.52	
Period Average		.789	366,000	820			42		# 4.55		3.36	2.63		1.10	
Tons of Constituents, Average Tons Period			1954 1946-1954								36,200 48,800	33,500 49,700		21,300 24,600	

Río Conchos near Ojinaga, Chihuahua

Sampling by U.S. Section

Jan.	6	1.40	16,100	1,460	.34	7.8	50	22	5.70	1.76	7.70	2.90	8.98	3.40	.03
Feb.	6	1.39	14,700	1,430			51		# 7.06		7.48	2.95		3.00	
Mar.	8	1.40	7,570	1,490			52		# 7.36		7.90	2.60		3.55	
Apr.	6	1.18	1,090	1,190			36		# 8.06		4.53	2.23		2.15	
May	10	1.37	2,140	1,300			30		# 9.75		4.08	2.70		2.15	
June	6	1.62	1,230	1,680			46		# 9.39		7.86	2.30		4.90	
July	5	1.16	17,000	1,160	.21	8.0	34	15	6.74	1.10	4.20	2.45	7.94	1.90	.03
Aug. ᵘ		.58	76,500	624			38		# 3.95		2.45	2.42		.89	
Sept.	5	.89	44,500	953			47		# 5.17		4.53	2.71		1.55	
Oct.	4	1.17	29,400	1,220			49		# 6.47		6.13	3.50		2.40	
Nov.	4	1.38	19,100	1,420			48		# 7.66		7.10	3.37		2.85	
Dec.	5	1.50	15,500	1,540			50		# 7.96		7.98	3.15		3.55	
Mean ⊕ (∯ 65)		.885	∯ 244,830	931			44		# 5.33		4.24	2.69		1.66	
Period Average		.623	514,000	665			39		# 4.20		2.63	2.60		.955	
Tons of Constituents, Average Tons Period			1954 1935-1954								36,700 67,800	30,400 87,600		22,100 38,000	

Rio Grande at Johnson Ranch, Texas

Sampling by U.S. Section

Jan.	13	1.41	15,900	1,510	.33	7.8	49	22	6.02	1.88	7.85	2.95	9.48	3.50	.02
Feb.	12	1.43	13,500	1,510			53		# 7.26		8.08	2.80		3.35	
Mar.	14	1.49	6,620	1,570			52		# 7.76		8.50	2.63		3.70	
Apr.	12	.97	19,700	997			37		# 6.67		3.90	3.83		1.00	
May	14	.76	8,820	766			28		# 5.77		2.25	2.60		.45	
June	18	.73	31,200	751			35		# 4.88		2.65	3.20		.60	
July	14	.93	18,600	943	.16	8.0	39	10	5.08	.79	3.84	2.65	6.25	.95	.04
Aug.	16	.73	146,000	795			27		# 6.17		2.28	3.20		.65	
Sept.	15	.88	55,100	936			42		# 5.57		4.02	3.00		1.70	
Oct.	3	.96	39,500	1,020			45		# 5.87		4.74	3.05		1.95	
Nov.	12	1.35	22,100	1,450			55		# 6.47		7.98	1.45		3.60	
Dec.	13	1.44	18,700	1,520			54		# 6.96		8.28	1.71		4.00	
Mean ⊕ (∯ 159)		.874	∯ 395,740	931			37		# 6.05		3.62	3.02		1.29	
Period Average		.934	495,000	992					# 5.58		4.45	2.71		2.01	
Tons of Constituents, Average Tons Period			1954 1948-1954								51,300 73,800	55,800 58,700		28,200 51,300	

Rio Grande at Langtry, Texas

Sampling by U.S. Section

Jan.	10	.91	24,800	980	.18	8.1	40	20	4.21	1.90	4.20	3.05	5.18	2.10	.04
Feb.	11	.92	23,000	1,000	.21	8.0	44	20	3.85	1.87	4.52	2.90	5.30	2.05	.03
Mar.	12	.85	19,800	938	.16	8.0	44	19	3.88	1.54	4.20	2.87	4.94	1.88	.04
Apr.		ᵘ.43	ᵘ 48,200	436			ᵘ44	ᵘ22	ᵘ 1.99	ᵘ .62	ᵘ 2.06	ᵘ 1.39	ᵘ 2.27	ᵘ 1.06	
May	11	.52	38,600	542	.14	8.1	23	9	3.80	.51	1.27	3.23	1.84	.50	.05
June	16	.47	121,000	524	.03	8.0	22	11	3.76	.38	1.17	3.20	1.61	.60	.06
July	8	.73	33,600	766	.14	8.1	33	14	4.28	.94	2.62	3.10	3.79	1.10	.10
Aug.	15	.67	145,000	736	.25	8.1	26	7	4.94	.74	2.00	3.00	4.23	.55	0
Sept.	6	.77	76,400	861	.17	8.2	38	17	4.59	.88	3.36	3.10	4.33	1.55	.02
Oct.	6	.88	52,800	971	.21	8.4	44	22	4.32	1.19	4.28	2.47	5.33	2.20	T
Nov.	5	.95	30,100	1,050	.20	8.2	42	21	4.39	1.98	4.62	2.93	5.80	2.35	.01
Dec.	7	.95	28,200	1,030	.20	8.1	43	20	4.38	1.53	4.54	2.95	5.47	2.10	.02
Mean ⊕ (∯ 107)		.639	∯ 641,500	698			33	14	4.02	.808	2.37	2.86	3.37	1.05	
Period Average		.775	732,000	793			43	22	3.71	1.12	3.65	2.65	4.10	1.85	
Tons of Constituents, Average Tons Period			1954 1945-1954						110,000 95,500	13,400 17,500	74,400 108,000	117,000 102,000	221,000 253,000	50,800 84,500	

T Trace ∯ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions # Sum of calcium and magnesium ᵘ Estimated

CHEMICAL ANALYSIS OF WATER SAMPLES FROM THE RIO GRANDE AND TRIBUTARIES – 1954

Month	No. of Samples	Dissolved Solids: Tons Per Acre Foot	Dissolved Solids: Total Tons	Mean EC x10⁶ @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3

Pecos River near Comstock, Texas

Sampling by U.S. Section

Jan.	6	2.92	26,900	3,420	.17	8.0	57	62	8.10	6.56	19.8	2.85	10.32	21.50	.02
Feb.	4	3.07	23,900	3,570	.22	8.0	59	63	7.85	6.92	21.0	2.40	10.94	22.65	.02
Mar.	9	3.10	27,000	3,540	.18	7.9	59	64	7.85	6.84	20.8	2.10	10.84	22.80	.01
Apr.		E.91	E 66,900	961			E46	E 47	E 4.80	E 1.80	E 5.62	E 2.58	E 3.96	E 5.70	
May	5	2.20	102,000	2,580	.19	8.1	57	59	7.22	3.60	14.4	2.75	7.58	15.15	.06
June	8	.44	773,000	518	.11	8.2	24	27	3.30	.55	1.22	2.55	1.11	1.40	.06
July †	5	2.25	109,000	2,650	.24	8.1	52	59	7.86	4.72	13.8	3.00	7.79	15.55	.15
Aug.	4	2.02	44,800	2,480	.27	7.9	53	59	6.70	4.64	12.6	2.63	7.26	14.45	.09
Sept.	6	1.90	28,700	2,250	.22	8.1	53	59	5.98	4.37	11.9	2.73	6.50	13.10	.05
Oct.	4	2.63	45,000	3,010	.23	8.0	56	60	7.85	5.59	16.9	2.65	9.60	18.40	.04
Nov.	4	2.15	25,800	2,560	.18	8.3	53	58	6.85	5.30	13.9	2.45	8.42	15.25	.02
Dec.	5	1.97	23,000	2,340	.16	8.4	55	58	6.32	4.11	12.6	2.31	7.33	13.60	.02
Mean ⊕ | Ø 60		.639	Ø 1,296,000	748			36	40	3.75	1.01	2.70	2.57	1.90	3.00	
Period Average		3.09	1,239,000	3,290			54	55	10.07	6.08	18.82	2.54	13.29	19.19	
Tons of Constituents, Average Tons Period		1954							207,000	33,900	171,000	213,000	252,000	293,000	
		1935-1954							110,000	40,300	236,000	41,600	348,000	371,000	

Río San Diego at Jiménez, Coahuila

Sampling by Mexican Section

Jan.	2	.40	1,410	446	.05	8.2	14	11	3.14	.76	.60	3.10	.86	.50	.08
Feb.	3	.41	1,020	460			15		# 3.98		.73	3.10		.65	
Mar.	3	.39	959	433			17		# 3.68		.73	2.65		.55	
Apr.	5	.39	1,940	427			15		# 3.82		.68	2.85		.55	
May	4	.31	3,460	335			12		# 3.02		.42	2.57		.30	
June	4	.27	5,510	296			12		# 2.66		.35	2.10		.25	
July	2	.25	3,010	252	.07	7.9	14	12	1.71	.44	.36	1.57	.48	.30	.16
Aug.	4	.21	1,180	280			15		# 2.49		.43	1.70		.35	
Sept.	4	.30	1,300	316			18		# 2.59		.57	1.83		.45	
Oct.	4	.24	3,200	292			16		# 2.45		.48	1.91		.30	
Nov.	4	.34	1,820	394			14		# 3.38		.55	2.67		.45	
Dec.	4	.38	1,570	431			14		# 3.75		.62	3.10		.55	
Mean ⊕ | Ø 43		.294	Ø 26,379	328			14		# 2.86		.468	2.22		.358	
Period Average		.372	20,400	410			16		# 3.56		.676	2.59		.567	
Tons of Constituents, Average Tons Period		1954									1,310	8,130		1,550	
		1950-1954									1,160	5,810		1,500	

Río San Rodrigo near El Moral, Coahuila

Sampling by Mexican Section

Jan.	1	.29	644	328	.05	8.1	6	9	2.63	.56	.22	2.60	.43	.30	.06
Feb.	1	.35	486	356			11		# 3.38		.42	2.90		.30	
Mar.	1	.30	273	328			13		# 2.98		.44	2.60		.30	
Apr.	1	.30	285	324			11		# 3.08		.38	2.55		.30	
May	1	.27	2,460	308			8		# 2.99		.26	2.67		.20	
June	1	.21	2,370	228			10		# 2.09		.22	1.85		.15	
July	1	.24	1,720	230	.07	8.1	14	11	1.46	.53	.33	1.60	.46	.25	.05
Aug.	3	.33	1,360	432			13		# 3.88		.60	3.00		.60	
Sept.	4	.45	1,050	505			28		# 3.58		1.40	1.65		1.20	
Oct.	3	.20	600	225			12		# 2.07		.29	1.88		.20	
Nov.	4	.33	1,180	389			18		# 3.28		.70	2.43		.60	
Dec.	4	.30	717	322			15		# 2.80		.49	2.31		.45	
Mean ⊕ | Ø 25		.271	Ø 13,145	302			13		# 2.71		.399	2.21		.331	
Period Average		.336	11,100	366			13		# 3.29		.489	2.58		.423	
Tons of Constituents, Average Tons Period		1954									605	4,370		774	
		1950-1954									505	3,470		673	

Rio Grande at Eagle Pass, Texas

Sampling by Mexican Section

Jan.	26	.89	41,800	1,050	.15	8.0	43	35	4.06	1.85	4.55	3.13	3.65	3.75	.04
Feb.	24	.97	40,200	1,130			46		# 5.97		5.12	2.93		4.15	
Mar.	27	.99	26,700	1,150			47		# 5.97		5.40	2.77		4.40	
Apr.	25	.64	140,000	740			35		# 4.82		2.65	2.95		2.15	
May	27	.59	124,000	634			35		# 4.08		2.18	2.70		1.75	
June =		.37	1,034,000	422											
July †		.55	153,000	622											
Aug.	24	.68	178,000	808			37		# 5.04		2.96	2.90		2.20	
Sept.	23	.75	134,000	837			37		# 5.27		3.10	2.85		2.15	
Oct.	26	.76	150,000	905			40		# 5.27		3.58	2.80		2.75	
Nov.	25	.89	81,900	1,050			39		# 6.12		3.92	3.07		3.40	
Dec.	26	.90	71,500	1,040			41		# 6.17		4.25	3.17		3.60	
Mean ⊕ | Ø 253		.491	Ø 2,174,200	858											
Period Average															
Tons of Constituents, Average Tons Period		1954													
		1938-1954													

Ø Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions # Sum of calcium and magnesium = Estimated † The station at Pecos River near Comstock was washed away by the June-July 1954 flood. Beginning July 1954, the sampling point was changed from "near Comstock" to a point 1.8 mile above the mouth of the river.

CHEMICAL ANALYSIS OF WATER SAMPLES FROM THE RIO GRANDE AND TRIBUTARIES – 1954

Month	No. of Samples	Dissolved Solids: Tons Per Acre Foot	Dissolved Solids: Total Tons	Mean EC$_x$10^6 @25°C	Boron p.p.m.	pH	% Na **	% Cl ***	Mean Milligram Equivalents per Liter: Ca	Mg	Na	CO_3 + HCO_3	SO_4	Cl	NO_3
Sampling by Mexican Section — Río Salado at Las Tortillas, Tamaulipas															
Jan.	1	1.85		1,960	.41	7.8	43	40	7.78	3.47	8.65	2.05	9.96	7.95	.03
Feb.		No Samples Collected													
Mar.		No Flow													
Apr.		No Samples Collected													
May	1	.50		538			29		# 3.85		1.54	2.03		.90	
June	2	.49		551			36		# 3.36		1.93	1.71		1.30	
July	2	.40		466	.14	7.8	35	28	2.34	.55	1.64	1.71	1.53	1.30	.03
Aug.		No Samples Collected													
Sept.	2	1.41		1,520			44		# 8.76		6.83	2.30		4.80	
Oct.	3	.70		804			45		# 4.28		3.44	1.10		2.25	
Nov.	1	.43		530			39		# 3.07		1.96	1.63		1.65	
Dec.		No Flow													
Mean ⊕ Period Average															
Tons of Constituents, Average Tons Period															
Sampling by Mexican Section — Rio Grande at Roma, Texas															
Jan.	30	.45	88,400	523	.11	8.2	31	23	2.84	.60	1.62	2.40	1.62	1.20	.04
Feb.	19	.49	145,000	561	.13	8.0	35	22	2.89	.71	1.90	2.52	1.85	1.25	.05
Mar.	4	.61	165,000	743	.2	8.0	40	31	3.28	1.17	2.92	2.70	2.41	2.30	.04
Apr.	5	.70	99,100	813	.3	8.1	41	31	3.60	1.13	3.25	2.85	2.72	2.55	.03
May	4	.73	222,000	803	.19	8.0	41	32	3.65	1.06	3.27	2.65	2.78	2.60	.04
June	5	.56	194,000	653	.10	8.0	37	30	2.94	.96	2.32	2.40	2.08	1.95	.04
July	4	.38	37,400	415	.10	7.8	24	18	2.59	.51	.99	2.30	1.03	.75	.16
Aug.	4	.37	53,400	450	.09	8.0	27	21	2.68	.60	1.20	2.35	1.15	.95	.05
Sept.	5	.44	45,800	530	.11	8.1	30	25	2.92	.76	1.60	2.51	1.47	1.35	.05
Oct.	4	.50	23,300	611	.07	8.1	34	27	3.21	.79	2.07	2.75	1.77	1.65	.03
Nov.	3	.54	37,000	628	.10	8.0	34	26	3.39	.69	2.14	2.70	1.98	1.65	.03
Dec.	4	.44	46,700	525	.05	8.3	39	36	2.24	.93	2.00	1.60	1.85	1.90	T
Mean ⊕	∅ 91	.545	∅1,157,100	633	.141	8.0	37	28	3.06	.875	2.27	2.50	2.03	1.79	.045
Period Average		.720	1,845,000	831			45	34	3.24	1.24	3.64	2.29	3.10	2.80	
Tons of Constituents, Average Tons Period		1954							177,000	30,700	151,000	217,000	282,000	183,000	
		1944-1954							226,000	52,600	292,000	239,000	519,000	346,000	

T Trace ∅ Total ⊕ Weighted mean ** Percent of total cations *** Percent of total anions # Sum of calcium and magnesium

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1954

Rio Grande at El Paso, Texas

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
January		February		March		April		May		July		August		September		October		December	
1	2,300	6	2,230	14	2,640	19	1,390	26	1,500	1	1,440	17	2,630	22	4,090	28	3,660	1	3,470
2	2,260	7	2,320	15	2,510	20	1,450	27	1,500	2	1,420	18	2,870	23	4,220	29	3,480	2	3,290
3	2,270	8	2,250	16	2,760	21	1,420	28	1,510	3	1,410	19	2,930	24	3,710	30	3,330	3	3,330
4	2,280	9	2,250	17	2,730	22	1,450	29	1,540	15	1,410	20	2,130	25	3,850	31	3,550	4	3,440
5	2,280	10	2,250	18	2,730	23	1,400	30	1,530	16	1,370	21	760	26	2,260	November		5	3,260
6	2,300	11	2,280	19	2,640	24	1,420	31	1,640	17	1,340	22	1,020	27	2,060	1	3,330	6	3,310
7	2,310	12	2,280	20	2,670	25	1,380	June		18	1,340	23	647	28	2,280	2	3,470	7	3,390
8	2,270	13	2,250	21	2,900	26	1,400	1	1,520	19	1,360	24	1,040	29	2,680	3	3,570	8	3,310
9	2,290	14	2,280	22	2,740	27	1,380	2	1,560	20	1,340	25	731	30	3,050	4	3,370	9	3,310
10	2,260	15	2,320	23	2,880	28	1,390	3	1,500	21	1,340	26	933	October		5	3,330	10	3,300
11	2,300	16	2,360	24	2,990	29	1,390	4	1,510	22	1,480	27	986	1	3,600	6	3,340	11	3,270
12	2,340	17	2,320	25	2,830	30	1,390	5	1,520	23	1,410	28	1,750	2	3,560	7	3,360	12	3,250
13	2,330	18	2,310	26	1,750	May		6	1,550	24	1,470	29	2,130	3	590	8	3,360	13	3,240
14	2,400	19	2,370	27	1,610	1	1,420	7	1,540	25	1,410	30	2,250	4	794	9	3,540	14	3,250
15	2,260	20	2,380	28	1,550	2	1,360	8	1,480	26	1,220	31	2,310	5	1,250	10	3,450	15	3,190
16	2,360	21	2,380	29	1,510	3	1,350	9	1,500	27	1,060	September		6	1,920	11	3,370	16	3,220
17	2,240	22	2,360	30	1,490	4	1,380	10	1,480	28	1,290	1	2,350	7	2,510	12	3,450	17	3,210
18	2,270	23	2,280	31	1,490	5	1,390	11	1,460	29	1,410	2	2,310	8	559	13	3,460	18	3,190
19	2,330	24	2,360	April		6	1,430	12	1,440	30	1,480	3	1,520	9	544	14	3,310	19	3,220
20	2,430	25	2,280	1	1,490	7	1,460	13	1,430	31	1,410	4	1,510	10	767	15	3,330	20	3,230
21	2,280	26	2,360	2	1,480	9	1,420	14	1,410	August		5	1,480	11	1,110	16	3,290	21	3,440
22	2,310	27	2,400	3	1,450	10	1,490	15	1,410	1	1,420	6	1,580	12	1,900	17	3,310	22	3,230
23	2,320	28	2,340	4	1,410	11	1,510	16	1,410	2	1,450	7	1,880	13	2,520	18	3,550	23	3,340
24	2,300	March		5	1,400	12	1,520	17	1,380	3	1,540	8	2,020	14	2,830	19	3,340	24	3,400
25	2,410	1	2,270	6	1,440	13	1,460	18	1,400	4	1,490	9	2,300	15	3,210	20	3,720	25	3,410
26	2,380	2	2,240	7	1,410	14	1,400	19	1,390	5	1,440	10	2,510	16	3,540	21	3,560	26	3,390
27	2,360	3	2,260	8	1,430	15	1,400	20	1,400	6	1,390	11	3,280	17	3,360	22	3,240	27	3,300
28	2,310	4	2,240	9	1,450	16	1,400	21	1,420	7	1,470	12	3,020	18	3,470	23	3,340	28	3,320
29	2,340	5	2,180	10	1,410	17	1,420	22	1,390	8	850	13	3,140	19	3,330	24	3,370	29	3,260
30	2,380	6	2,170	11	1,390	18	1,360	23	1,380	9	1,040	14	3,010	20	3,270	25	3,290	30	3,230
31	2,380	7	2,240	12	1,390	19	931	24	1,420	10	1,110	15	3,020	21	3,340	26	3,250	31	3,190
February		8	2,190	13	1,410	20	1,390	25	1,450	11	1,720	16	3,120	22	3,320	27	3,380		
1	2,400	9	2,260	14	1,410	21	1,440	26	1,410	12	1,400	17	3,420	23	3,380	28	3,300		
2	2,390	10	2,260	15	1,410	22	1,530	27	1,420	13	1,660	18	3,770	24	3,380	29	3,260		
3	2,340	11	2,370	16	1,440	23	1,520	28	1,450	14	1,250	19	3,830	25	3,570	30	3,490		
4	2,290	12	2,830	17	1,400	24	1,490	29	1,360	15	1,870	20	3,810	26	3,650				
5	2,310	13	2,520	18	1,390	25	1,530	30	1,370	16	2,100	21	3,840	27	3,560				

Rio Grande at Fort Quitman, Texas

January		February		March		May		June		July		August		September		October		November	
6	10,950	17	10,620	31	13,050	5	14,540	30	2,760	22	1,310	23	608	22	12,430	8	1,190	17	12,080
13	11,340	24	10,730	April		12	12,990	30	2,760	28	14,000	23	586	29	13,400	13	12,080	24	12,550
20	11,080	March		7	13,750	19	976	July		August		25	1,410	October		20	12,080	December	
27	11,480	3	10,540	14	1,670	19	981	7	14,000	4	13,050	September		4	1,200	27	12,080	1	12,240
February		10	11,130	14	1,670	26	14,120	21	2,460	6	1,410	1	3,550	5	1,190	November		8	11,920
3	11,340	17	11,520	21	14,780	June		21	2,440	12	12,560	8	11,850	6	1,380	3	12,230	15	12,080
10	10,500	24	11,940	28	13,940	2	15,570	22	1,310	18	13,570	15	11,850	7	1,200	10	12,550	22	11,920
																		29	12,230

Rio Grande at Upper Presidio Station

April		May		June		June		July		August		August		August		September		October	
17	528	21	969	5	1,060	12	560	5	610	9	562	23	780	25	595	15	6,360	8	603
May		22	756	5	1,050	14	840	7	606	10	721	23	873	31	575	21	7,390	12	490
20	708	22	753	7	749	17	730	August		12	641	24	552	31	583	24	1,590	18	2,290
20	765	25	687	8	663	July		3	362	16	558	24	538	September		28	3,500	25	3,910
21	928			9	678	1	1,300	6	761	20	731	25	605	3	620	October		November	
														7	4,110	5	874	1	4,260

Río Conchos at Cuchillo Parado, Chihuahua

January		February		March		April		May		June		August		September		October		November	
1	1,430	5	1,470	12	1,450	21	2,270	28	2,020	30	1,510	6	809	3	694	8	926	10	1,330
4	1,470	8	1,480	15	1,500	25	1,900	31	2,000	July		9	901	6	680	11	785	12	1,400
6	1,470	10	1,400	17	1,570	26	1,520	June		5	1,300	9	958	8	823	13	868	15	1,260
8	1,430	12	1,430	19	1,660	30	1,590	2	1,920	9	990	11	678	10	1,060	15	1,050	17	1,240
11	1,460	15	1,300	22	1,570	May		7	2,170	12	870	13	740	13	1,270	18	1,360	19	1,280
13	1,450	17	1,300	24	1,690	3	1,290	9	2,220	16	872	16	922	15	1,330	20	1,430	22	1,280
15	1,430	19	1,350	29	1,690	5	1,560	11	2,320	19	1,230	18	1,100	17	1,490	22	1,490	24	1,310
18	1,450	22	1,330	31	1,940	7	2,300	14	1,960	21	1,220	19	985	20	1,360	25	1,480	26	1,400
20	1,450	24	1,370	April		10	1,550	16	2,110	23	1,210	20	771	22	1,470	27	1,460	29	1,470
22	1,450	26	1,460	2	2,160	12	2,390	18	2,170	26	1,370	22	598	24	724	29	1,520	December	
25	1,440	March		9	2,560	14	2,260	21	2,260	28	1,510	23	857	27	941	November		1	1,480
27	1,410	1	1,450	12	2,460	17	2,020	23	4,120	30	1,470	24	566	29	1,250	1	1,360	3	1,470
29	1,450	3	1,410	14	2,240	19	1,980	25	2,950	August		25	819	October		3	1,350	20	1,440
February		5	1,430	16	1,920	21	1,690	27	1,860	2	1,620	27	768	1	1,230	5	1,300		
1	1,450	8	1,400	18	3,050	24	1,820	27	1,880	3	524	30	611	4	1,150	8	1,320		
3	1,470	10	1,410	21	1,950	26	1,910	28	1,770	4	1,130			6	981				

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1954

Río Conchos near Ojinaga, Chihuahua

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C
January		February		March		April		May		June		August		September		October		December	
4	1,400	13	1,430	19	1,550	20	1,580	21	1,040	21	1,880	2	1,100	18	1,480	21	1,450	3	1,560
8	1,470	18	1,390	22	1,600	26	923	21	1,090	28	1,500	3	1,090	24	875	29	1,590	8	1,580
14	1,460	22	1,400	26	1,620	May		22	1,610	July		11	714	29	1,050	November		15	1,620
16	1,490	27	1,410	30	1,650	7	1,700	28	1,210	6	1,000	17	1,030	October		5	1,480	22	1,520
23	1,490	March		April		14	1,670	June		10	1,210	September		5	1,170	10	1,480	30	1,420
27	1,490	3	1,500	2	1,630	18	1,670	1	1,440	12	1,210	2	865	16	1,060	17	1,320		
February		8	1,460	6	1,610	20	1,180	8	2,080	15	1,320	9	845			24	1,430		
1	1,480	11	1,470	9	1,610	20	1,180	12	1,770	22	907								
8	1,470	15	1,480	17	1,580	20	1,180	17	1,720										

Rio Grande at Johnson Ranch, Texas

January		February		March		April		May		June		July		August		October		November	
1	1,510	8	1,510	17	1,580	21	748	28	656	21	683	31	1,310	30	682	3	767	28	1,520
4	1,520	10	1,530	19	1,570	27	1,380	June		25	990	August		September		5	1,070	30	1,560
8	1,510	12	1,540	22	1,580	29	710	1	858	29	958	2	1,300	1	575	8	760	December	
10	1,510	15	1,580	24	1,570	May		3	929	July		4	1,170	3	910	15	971	2	1,560
12	1,530	17	1,560	26	1,590	1	791	5	974	1	504	6	1,110	5	858	22	1,320	5	1,590
14	1,530	20	1,510	29	1,610	3	843	6	710	3	1,130	8	564	7	884	28	1,600	7	1,600
16	1,520	22	1,490	31	1,620	5	926	6	800	7	716	10	955	9	908	November		9	1,640
18	1,540	24	1,450	April		7	994	7	487	8	737	12	692	12	1,100	2	1,680	12	1,650
20	1,500	26	1,430	2	1,620	10	1,060	7	482	10	1,070	14	953	14	1,240	8	1,570	14	1,650
22	1,510	March		5	1,610	12	1,120	9	765	12	765	16	778	16	1,420	10	1,560	16	1,680
25	1,510	1	1,490	7	1,620	14	1,150	11	1,050	14	805	18	774	18	1,450	13	1,550	19	1,650
27	1,500	3	1,480	8	1,620	17	1,190	12	809	16	1,460	19	741	20	1,460	16	1,500	21	1,620
29	1,500	6	1,530	12	873	18	784	12	823	21	1,050	21	986	22	962	18	1,550	23	1,650
February		8	1,590	13	957	19	555	13	594	23	588	23	610	24	1,030	20	1,520	26	1,600
1	1,510	10	1,600	14	1,050	21	817	15	675	25	1,150	25	814	26	1,360	22	1,430	28	1,590
4	1,490	12	1,600	16	583	24	1,030	17	597	27	934	26	788	28	978	24	1,480	30	1,570
6	1,490	15	1,660	19	594	26	581	19	984	29	1,210	27	707	30	985	26	1,490		

Rio Grande at Langtry, Texas

January		February		March		April		May		June		July		August		September		November	
4	982	8	1,010	15	893	12	295	5	759	10	982	6	606	17	882	14	793	23	1,100
6	993	10	994	19	927	14	410	7	599	14	636	8	705	20	633	16	848	29	1,090
8	989	12	992	22	938	15	415	10	627	15	452	12	916	24	567	21	939	December	
11	989	15	974	24	911	16	708	12	633	15	449	15	831	24	581	October		5	1,050
13	980	17	960	26	910	19	1,020	14	642	16	629	19	783	27	833	1	1,180	7	977
15	964	19	966	29	873	21	838	17	620	18	866	23	779	27	835	5	999	9	1,000
18	961	23	999	31	841	22	231	19	586	21	700	26	1,030	28	747	12	1,340	14	1,020
22	966	26	1,050	April		22	240	21	852	23	665	30	913	28	744	19	695	16	1,010
25	983	March		2	825	22	267	24	392	25	3,570	August		30	728	26	890	21	1,010
29	1,000	2	1,040	5	791	26	636	28	438	28	317	2	866	30	731	30	936	30	1,100
February		5	996	7	761	28	633	June		28	320	4	682	September		November			
1	1,010	8	966	9	396	30	602	1	893	29	369	5	832	7	846	2	955		
3	1,010	10	933	9	411	May		4	814	30	804	10	1,170	7	847	9	1,090		
5	1,010	12	914	12	302	3	645	7	691			13	662	10	830	17	1,110		

Pecos River near Shumla, Texas

October		October		November		November		November		December		December		December		December	
13	2,680	29	2,790	5	2,770	17	2,610	23	2,570	2	2,560	9	2,550	16	2,660	21	2,710	30	2,840
22	2,960			12	2,680														

Pecos River near Comstock, Texas

January		February		March		March		April		April		April		May		June		June	
2	3,100	3	3,540	2	348	24	347	2	3,670	14	1,750	21	1,950	5	2,550	3	1,960	16	528
4	3,230	10	3,590	10	355	26	353	5	3,430	15	1,050	23	421	12	2,830	9	1,710	23	2,120
6	3,250	17	3,620	17	352	28	343	9	3,490	15	441	23	456	19	2,610	16	528	29	489
14	3,430	25	3,580	19	362	31	352	12	2,450	16	461	26	1,050	26	2,540	16	511	29	498
20	3,550			22	350			12	1,730	20	1,710	28	1,640	26	2,540				
27	3,620																		

Pecos River near Mouth

July		July		August		September		September		October		November		November		December		December	
2	2,150	21	2,710	4	2,580	7	2,320	21	2,200	5	2,050	2	2,700	17	2,570	2	2,460	21	2,590
8	2,890	27	2,600	10	2,420	7	2,330	28	2,200	12	2,140	9	2,650	22	2,520	7	2,440	28	1,860
14	2,790			17	2,440	10	2,300			19	4,590					14	2,490		
				24	2,380	14	2,260			26	2,780								

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1954

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rio Grande at Maverick Canal at Headgate

May		June		July		July		August		September		October		October		November		December	
21	744	13	885	5	1,120	29	1,160	20	951	12	836	4	946	28	978	19	1,040	11	964
22	1,650	14	815	6	1,240	30	1,140	21	1,010	13	878	5	1,060	29	963	20	1,050	12	1,050
23	882	15	520	7	1,400	31	1,120	22	942	14	897	6	718	30	941	21	1,010	13	1,050
24	714	16	433	8	1,240	August		23	876	15	868	7	701	31	961	22	1,020	14	1,060
25	582	17	489	9	1,260	1	1,130	24	915	16	888	8	856	November		23	1,040	15	1,060
26	403	18	687	10	1,310	2	990	25	706	17	882	9	825	1	906	24	1,040	16	1,070
27	543	19	782	11	1,350	3	1,090	26	649	18	888	10	851	2	970	25	972	17	1,090
28	1,050	20	970	12	1,330	4	1,210	27	681	19	891	11	835	3	963	26	1,020	18	1,060
29	487	21	964	13	1,330	5	1,280	28	910	20	907	12	931	4	1,000	27	1,040	19	1,010
30	558	22	751	14	1,350	6	1,070	29	759	21	911	13	1,040	5	986	28	1,030	20	1,040
31	586	23	796	15	1,360	7	1,270	30	815	22	949	14	1,100	6	993	29	1,080	21	1,020
June		24	1,050	16	1,350	8	1,070	31	835	23	817	15	1,160	7	974	30	1,080	22	1,030
1	673	25	1,150	17	1,250	9	938	September		24	942	16	955	8	950	December		23	1,050
2	738	26	1,240	18	1,230	10	740	1	767	25	977	17	992	9	1,000	1	1,060	24	1,040
3	745	27	310	19	1,260	11	801	2	772	26	953	18	1,020	10	994	2	961	25	1,050
4	804	28	385	20	1,330	12	970	3	832	27	879	19	1,040	11	987	3	1,070	26	986
5	970	29	353	21	1,250	13	1,130	4	762	28	954	20	1,120	12	1,000	4	1,080	27	1,090
6	1,140	30	423	22	1,200	14	1,030	5	796	29	977	21	1,180	13	1,020	5	1,000	28	1,110
7	1,080	July		23	1,170	15	827	6	764	30	1,030	22	1,158	14	1,040	6	955	29	1,080
8	1,110	1	494	24	1,240	16	845	7	734	October		23	1,080	15	1,020	7	1,010	30	1,100
9	952	2	745	25	1,160	17	869	8	714	1	376	24	1,030	16	1,050	8	1,040	31	1,070
10	744	3	808	26	1,150	18	869	9	817	2	706	25	1,010	17	1,030	9	1,040		
11	732	4	972	27	1,110	19	934	10	857	3	863	26	997	18	1,070	10	992		
12	738			28	1,130			11	909			27	994						

Río San Diego at Jiménez, Coahuila

January		February		April		May		June		July		August		September		October		November	
2	496	20	480	1	504	1	442	1	408	3	247	16	304	16	438	15	414	22	331
19	416	March		8	429	8	474	8	252	17	257	24	312	24	373	22	431	December	
February		1	503	15	383	16	465	15	290	August		September		October		November		2	485
1	368	8	406	21	364	24	271	28	274	1	294	1	417	2	381	1	437	9	487
9	499	17	420	30	517					9	319	8	329	6	428	8	477	17	321
																15	342	24	489

Río San Rodrigo near El Moral, Coahuila

January		March		May		July		August		September		September		October		November		December	
3	338	3	315	2	303	12	231	25	774	11	628	25	572	9	322	2	353	1	287
February		April		June		August		September		18	549	October		21	327	9	700	8	282
2	340	3	316	17	223	3	299	3	616			1	281			16	347	16	345
						17	272									23	448	23	685

Rio Grande at Eagle Pass, Texas

January		February		March		April		May		June		August		September		October		November	
1	1,030	4	1,100	10	1,160	13	957	15	881	16	319	16	876	20	896	23	1,060	27	1,040
2	1,030	5	1,100	11	1,140	14	444	17	997	17	462	17	881	21	917	25	1,150	29	1,090
4	1,030	6	1,110	12	1,150	15	460	18	1,010	18	537	18	914	22	972	26	1,030	30	1,100
5	1,040	8	1,110	13	1,130	16	940	19	892	19	1,510	19	1,110	23	916	27	1,140	December	
6	1,040	9	1,100	15	1,170	17	952	20	901	20	1,500	20	965	24	986	28	1,120	1	1,090
7	1,040	10	1,120	16	1,130	19	792	21	913	21	1,450	21	974	25	921	29	984	2	1,030
8	1,030	11	1,120	17	1,150	20	799	22	605	22	1,500	23	958	27	1,020	30	985	3	1,050
9	1,030	12	1,120	18	1,140	21	852	24	625	23	1,500	24	975	28	1,010	November		4	1,000
11	1,040	13	1,140	19	1,130	22	899	25	454	24	867	25	574	29	911	1	1,040	7	985
12	1,040	15	1,130	20	1,120	23	990	26	610	25	949	26	561	30	899	2	1,140	8	983
13	1,040	16	1,140	22	1,120	24	448	27	612	26	953	27	607	October		3	1,040	9	967
14	1,040	17	1,200	23	1,120	26	590	28	599	July		28	607	1	820	5	1,060	10	1,020
15	1,050	18	1,200	24	1,140	27	599	29	492	24	1,130	29	656	2	837	6	958	11	1,010
16	1,050	19	1,190	25	1,150	28	658	30	461	25	1,140	30	661	4	754	8	999	13	1,010
18	1,050	20	1,170	26	1,160	29	631	31	462	26	1,140	31	707	5	734	9	1,050	14	1,050
19	1,070	22	1,160	27	1,160	30	728	June		28	1,120	September		6	815	10	984	15	1,070
20	1,070	23	1,140	29	1,170	May		1	544	29	1,130	1	714	7	871	11	980	16	1,080
21	1,070	24	1,170	30	1,220	1	499	2	606	30	1,190	2	749	8	851	12	983	17	1,050
22	1,070	25	1,160	31	1,210	3	735	3	572	31	1,180	3	727	9	818	13	984	18	1,110
23	1,080	26	1,150	April		4	753	4	586	August		4	822	11	874	15	1,120	20	1,100
25	1,080	27	1,160	1	1,200	5	763	5	966	2	1,180	6	818	12	845	16	1,090	21	1,110
26	1,070	March		2	1,250	6	862	7	955	3	1,180	7	784	13	842	17	1,150	22	1,110
27	1,080	1	1,160	3	1,250	7	855	8	985	4	1,180	8	744	14	1,020	18	1,140	23	1,100
28	1,100	2	1,110	5	1,250	8	955	9	982	9	1,110	9	817	15	1,020	19	1,150	24	1,100
29	1,100	3	1,110	6	1,220	10	884	10	696	10	790	14	882	16	982	20	1,150	25	1,110
30	1,020	4	1,160	7	1,160	11	888	11	700	11	788	15	917	18	948	22	1,020	27	1,130
February		5	1,060	8	1,170	12	974	12	703	12	1,110	16	931	19	1,150	23	1,020	28	1,120
1	1,020	6	1,110	10	1,110	13	1,030	14	861	13	837	17	890	20	1,060	24	1,030	29	1,120
2	1,110	8	1,140	12	1,100	14	891	15	616	14	888	18	888	21	1,160	25	1,030	30	1,140
3	1,100	9	1,150											22	1,020	26	1,020	31	1,140

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1954

Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rio Grande at San Antonio Crossing near Villa Guerrero, Coahuila

May		May		June		June		June		June		December		December		December	
18	984	19	1,040	1	726	7	819	11	1,080	14	820	8	1,010	13	985	17	976
		31	587	4	697	9	1,010			25	851			15	1,010		

December	
20	1,050
22	1,000

Rio Grande at Laredo, Texas

January		March		April		June		August		October		November		November		December		December	
2	1,030	10	1,210	23	555	8	698	24	1,020	11	767	5	1,050	20	1,060	4	1,090	19	1,080
5	1,040	15	1,220	24	791	10	761	25	1,030	15	859	6	1,020	21	1,010	5	1,070	20	1,090
12	1,050	17	1,230	26	478	12	792	26	1,030	19	1,030	7	1,020	22	1,040	6	1,080	21	1,080
16	996	19	1,240	28	504	14	1,050	30	704	25	1,020	8	1,010	23	1,070	7	1,090	22	1,090
19	1,070	22	1,250	29	485	16	823	September		27	1,150	9	1,010	24	1,100	8	1,080	23	1,090
25	1,090	24	1,230	May		18	461	6	792	27	1,110	10	1,010	25	1,090	10	1,090	24	1,090
February		26	1,250	4	586	19	802	8	879	28	1,170	11	971	26	1,010	11	1,100	25	1,080
1	1,120	31	1,240	10	716	August		10	897	29	1,170	12	1,050	27	1,100	12	1,090	26	1,080
6	1,060	April		12	830	2	1,250	13	825	30	1,070	13	1,040	28	1,120	13	1,080	27	1,080
8	1,130	2	1,230	17	881	3	760	23	994	31	1,130	14	1,060	29	1,100	14	1,080	28	1,090
12	1,090	6	1,230	28	553	7	1,180	27	1,020	November		15	1,050	30	1,080	15	1,090	29	1,100
15	1,150	8	1,230	31	570	9	1,200	October		1	1,100	16	1,040	December		16	1,090	30	1,090
19	1,170	12	650	June		10	1,130	1	992	2	1,080	17	1,030	1	1,080	17	1,080	31	1,090
22	1,190	16	751	2	828	16	1,010	6	436	3	1,040	18	1,050	2	1,070	18	1,090		
March		21	516	4	592	18	975	8	754	4	1,060	19	1,010	3	1,060				
4	1,270					20	1,110												

Río Salado at Las Tortillas, Tamaulipas

January		May		June		June		July		July		September		October		October		November	
25	1,980	25	521	8	579	26	453	3	570	31	450	7	702	5	477	8	536	11	526
												24	1,590			12	1,870		

Rio Grande at Chapeño, Texas

June		July		July		August		September		September		October		November		November		December	
11	652	2	458	23	371	11	435	1	486	22	544	15	567	1	585	24	613	10	604
14	659	6	381	26	392	13	439	3	488	24	535	18	568	3	585	26	623	13	609
16	655	8	362	28	392	16	459	7	507	27	539	20	568	5	586	30	602	16	610
18	648	9	362	30	390	18	433	8	501	30	551	22	569	8	586	December		17	613
21	596	12	362	August		20	453	10	500	October		25	577	12	590	1	605	20	624
23	559	15	363	2	395	23	465	13	500	1	545	27	577	16	624	3	600	22	624
28	563	16	361	4	397	25	468	15	514	7	561	29	579	17	600	6	600	27	631
30	714	19	369	6	411	27	478	17	524	11	561			19	636	8	605	29	626
		21	367	9	437	30	485	20	514	13	558			22	639			31	627

Rio Grande at Roma, Texas

January		January		January		February		February		March		May		July		September		November	
1	512	11	505	21	539	1	532	11	546	3	641	5	842	7	449	1	501	3	607
2	511	12	503	22	581	2	533	12	547	17	674	12	787	14	410	8	525	10	662
3	511	13	508	23	537	3	520	13	544	24	753	19	792	21	383	15	529	24	610
4	504	14	499	24	535	4	526	14	547	31	793	26	753	28	404	22	544	December	
5	504	15	499	25	533	5	527	15	574	April		June		August		29	553	8	620
6	500	16	512	26	546	6	541	16	570	7	846	2	666	4	408	October		5	591
7	501	17	505	27	546	7	555	17	554	9	597	9	674	11	439	6	689	22	595
8	510	18	507	28	546	8	538	18	569	14	812	16	663	18	467	13	606	29	615
9	529	19	508	29	535	9	554	24	580	21	1,040	23	576	25	473	20	593		
10	523	20	536	31	542	10	541			28	866	30	592			27	598		

ELECTRICAL CONDUCTIVITY OF WATER SAMPLES

1954

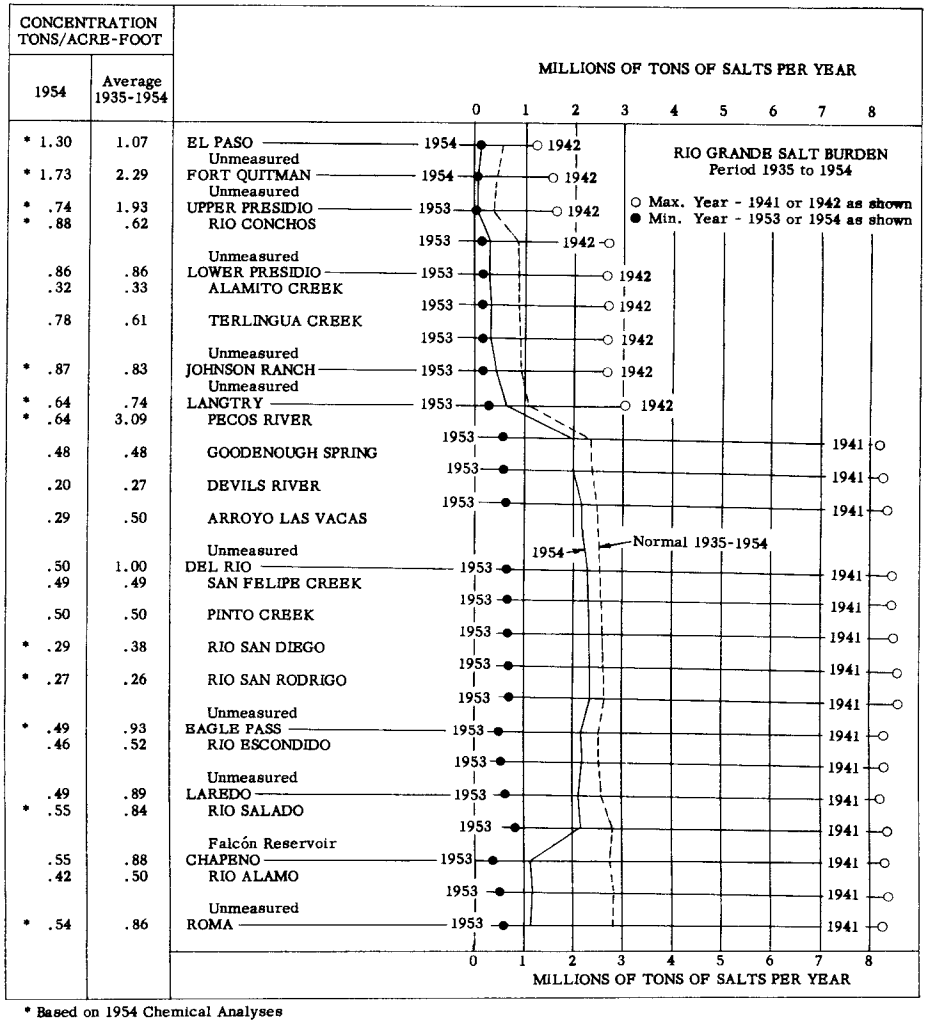
Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C	Date	ECx10⁶ @25°C

Rio Grande at Mercedes, Texas, Pumps

January		February		March		April		May		July		August		September		October		November	
1	1,710	6	744	15	983	21	926	27	938	3	906	10	1,090	15	845	23	1,420	27	1,000
2	1,490	7	743	16	865	22	549	28	926	4	1,220	11	1,000	16	838	24	1,140	28	1,020
3	1,300	8	816	17	851	23	996	29	933	5	1,110	12	915	17	801	25	1,110	29	1,060
4	1,210	9	772	18	835	24	995	30	958	6	1,100	13	827	20	812	26	1,300	30	1,120
5	1,200	10	732	20	832	25	1,080	31	922	7	1,110	14	716	21	818	27	898	December	
6	1,180	11	741	21	856	26	1,110	June		8	1,110	15	674	22	1,600	28	750	1	1,110
7	1,060	12	744	22	905	27	1,140	1	909	9	1,150	16	671	23	1,370	29	854	2	1,100
8	972	13	763	23	939	28	1,100	2	887	10	1,320	17	648	24	957	30	813	3	1,050
9	900	14	780	24	979	29	1,160	3	888	11	1,180	18	675	24	1,070	31	873	4	1,020
10	765	15	750	25	1,070	30	1,280	4	896	15	2,230	19	678	25	955	November		5	991
11	777	16	755	26	1,040	May		5	839	16	2,060	20	707	26	1,040	1	991	6	1,020
12	762	17	775	27	991	1	4,900	6	826	17	2,080	21	759	28	1,050	2	1,260	7	1,090
13	727	18	772	28	1,020	2	3,120	7	837	17	1,970	22	844	29	1,030	3	962	8	1,090
14	720	19	743	29	1,030	3	2,120	8	828	18	1,940	23	946	30	1,120	4	1,070	9	1,030
15	734	20	753	30	1,100	4	1,490	9	850	19	1,930	24	1,100	October		5	1,220	10	932
16	761	21	753	31	955	5	1,370	10	890	20	1,990	25	1,170	1	1,620	6	1,330	11	971
17	746	23	773	April		6	1,280	11	851	21	1,870	26	1,120	2	937	7	1,500	12	924
18	718	24	766	1	939	7	1,230	12	850	22	1,690	27	1,010	3	770	8	1,490	13	901
19	677	25	761	2	928	8	1,160	13	880	23	1,700	28	975	4	753	9	1,420	14	891
20	665	26	772	3	933	9	1,120	14	875	24	2,210	29	971	5	835	10	1,370	15	903
21	678	27	789	4	914	10	1,140	15	888	25	1,870	30	1,020	6	858	11	1,330	16	877
22	637	28	806	5	895	11	1,150	18	894	26	1,540	31	1,000	7	1,600	12	1,440	17	918
23	643	March		6	895	12	1,170	19	909	27	1,360	September		8	640	13	1,290	18	979
24	657	1	802	7	929	13	1,190	20	905	28	1,290	1	1,070	9	510	14	1,290	19	978
25	653	2	851	8	919	14	1,240	21	928	29	1,170	2	1,050	10	532	15	1,350	20	976
26	689	3	846	9	925	15	1,210	22	980	30	1,150	3	1,000	11	675	16	1,370	21	981
27	753	4	950	10	906	16	1,140	23	986	31	1,130	4	973	12	550	17	938	22	1,080
28	918	5	924	11	904	17	1,210	24	952	August		5	1,340	13	682	18	880	23	1,070
29	698	6	856	12	718	18	1,130	25	964	1	1,130	6	1,090	14	828	19	1,100	24	1,010
30	693	7	877	13	619	19	1,240	26	978	2	1,130	7	1,100	15	838	20	1,220	25	997
31	711	8	891	14	536	20	1,140	27	928	3	1,110	8	971	16	915	21	1,470	26	966
February		9	890	15	615	21	1,070	28	909	4	1,140	9	868	17	1,060	22	1,150	27	1,030
1	702	10	907	16	653	22	1,030	29	918	5	1,160	10	871	18	1,050	23	983	28	1,120
2	724	11	947	17	711	23	1,010	30	1,060	6	1,160	10	798	19	1,170	24	965	29	1,150
3	730	12	969	18	810	24	929	July		7	1,120	12	890	20	1,260	25	1,060	30	982
4	717	13	907	19	810	25	981	1	1,170	8	1,090	13	831	21	1,550	26	1,080	31	939
5	728	14	871	20	860	26	969	2	969	9	1,140	14	926	22	1,510				

RIO GRANDE SALT BURDEN

The term "salt," as used herein, means total dissolved solids. The 1954 concentrations which are marked by an asterisk (*) are based on the chemical analyses shown on preceding pages of this water bulletin. Those without asterisks are based either on chemical analyses reported in previous water bulletins or have been developed by deduction. The average concentrations shown for the period 1935 to 1954 are the weighted means of the values determined for the 20-year period indicated.



* Based on 1954 Chemical Analyses

SANITARY ASPECTS OF WATER QUALITY

The United States and Mexican Sections of this Commission and the Texas State Department of Health co-operate in the joint sanitary water-sampling program along the Rio Grande. All analyses below have been made under the "Rules of Laboratory Procedure," as approved by the participating agencies, and which conform with the procedures set out in the manual "Standard Methods for the Examination of Water and Sewage," Ninth Edition (1946), prepared by the American Public Health Association and the American Water Works Association. These analyses were made in the laboratories of the El Paso Water Plant, the Cameron County Health Unit, and the International Boundary and Water Commission. The percentages of Dissolved Oxygen (D.O.) shown below are the per cent saturation at the elevation of the sampling station.

Rio Grande at El Paso, Texas, Water Plant

Date 1954	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)	Date 1954	D. O. Percent Saturation	B. O. D. Parts Per Million	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)
Jan. 5	107	1.0	38,000	9,200	Oct. 19	130	1.8	23,000	59,000
12	103	2.2	6,200	8,900	26	185	2.2	23,000	98,500
19	118	3.2	6,200	4,100	Nov. 2	107	3.1	62,000	128,000
26	119	1.1	13,000	6,400	9	115	1.8	62,000	78,000
Feb. 2	113	.4	3,600	6,750	16	136	2.0	23,000	11,750
9	132	3.4	2,100	14,850	23	142	2.6	16,000	28,000
16	127	2.1	24,000	8,500	30	126	2.3	5,400	68,000
23	123	4.2	2,300	9,650	Dec. 7	131	3.3	16,000	44,000
Mar. 2	108	1.6	6,200	16,200	14	135	2.7	2,300	34,000
9	144	2.6	2,300	18,400	21	134	2.5	2,300	7,300
16	121	2.6	11,000	51,800	28	120	2.5	2,300	4,500
23	147	2.1	6,200	27,000					
Sept. 14	170	3.4	62,000	121,000	Total	3,303	56.7	650,400	1,009,800
21	210		230,000	146,000	Average	132	2.4	26,020	40,390

Franklin Canal at El Paso, Texas, Water Plant

Mar. 30	86.0	4.6	38,000	37,750	July 13	98.8	3.1	240,000	19,000
Apr. 6	117	2.7	38,000	17,000	20	87.2	3.2	36,000	36,000
13	102	3.5	16,000	20,150	27	90.4	4.7	240,000	105,000
20	38.0	6.2	24,000	13,150	Aug. 3	93.1	3.2	36,000	24,300
27	91.7	2.5	38,000	10,700	10	93.6	1.2	23,000	54,700
May 4	101	2.3	36,000	6,550	17	105	2.5	9,400	124,100
11	81.5	2.6	23,000	8,700	24	85.1	2.7	70,000	199,000
18	106	2.9	140,000	7,600	31	161	4.8	3,600	3,600
25	106	2.9	140,000	19,600	Sept. 7	94.4	2.5	70,000	47,500
June 1	106	2.1	55,000	7,100	28	108		93,000	39,500
8	108	2.3	36,000	13,200	Oct. 5	95.0		23,000	22,000
15	98.6	3.5	36,000	20,450	12	92.3	.9	23,000	28,000
22	97.6	3.3	380,000	16,650					
29	94.2	1.7	240,000	44,100	Total	2,635.5	73.9	2,143,000	958,500
July 6	98.0	2.0	36,000	13,100	Average	97.6	3.0	79,370	35,500

Rio Grande at Ysleta, Texas-Zaragoza, Chih. Bridge

Jan. 5	0	46.0	38,000,000	2,225,000	July 13	0	95.6	160,000,000	13,000,000
12	27.7	64.6	24,000,000	1,980,000	20	0	146.1	110,000,000	13,500,000
19	56.8	41.7	5,500,000	1,235,000	27	0	102.4	23,000,000	7,900,000
26	0	46.4	24,000,000	2,380,000	Aug. 3	0	81.9	23,000,000	1,410,000
Feb. 2	50.4	38.4	11,000,000	1,730,000	17	0	80.1	23,000,000	11,800,000
9	36.9	67.5	140,000,000	7,410,000	24	44.8	22.7	3,600,000	2,370,000
16	57.1	26.2	23,000,000	6,300,000	31	0	153	110,000,000	10,200,000
23	19.5	84.3	380,000,000	6,200,000	Sept. 7	0	95.6	36,000,000	1,045,000
Mar. 2	36.4	98.3	36,000,000	50,500,000	14	0	124	23,000,000	6,100,000
9	0	113.3	36,000,000	8,800,000	21	0	-	23,000,000	8,400,000
16	0	104.4	110,000,000	5,850,000	28	0	-	240,000,000	7,750,000
23	0	131.0	220,000,000	10,650,000	Oct. 5	0	-	130,000,000	5,200,000
30	43.4	22.9	2,300,000	2,000,000	12	0	113	380,000,000	6,600,000
Apr. 6	48.9	11.2	6,200,000	1,525,000	19	0	116	23,000,000	9,100,000
13	32.9	6.2	3,600,000	2,935,000	26	0	117.4	36,000,000	6,300,000
20	0	32.8	240,000,000	8,080,000	Nov. 2	0	133.8	36,000,000	6,200,000
27	59.7	5.8	11,000,000	13,500,000	9	0	142	62,000,000	9,000,000
May 4	54.3	4.1	6,200,000	1,360,000	16	0	136.5	34,000,000	9,900,000
11	-	-	140,000,000	4,865,000	23	0	131	36,000,000	4,650,000
18	0	51.5	62,000,000	4,310,000	30	0	125.6	23,000,000	3,300,000
25	0	83.5	62,000,000	3,580,000	Dec. 7	0	117.2	62,000,000	6,000,000
June 1	0	101	55,000,000	15,000,000	14	0	122.8	23,000,000	3,900,000
8	0	99.6	34,000,000	10,200,000	28	36.6	148.8	3,600,000	3,500,000
15	35.3	12.7	23,000,000	14,250,000					
22	0	73.3	62,000,000	6,000,000					
29	0	34.0	36,000,000	7,990,000	Total	640.7	3,785.2	3,437,000,000	359,325,000
July 6	0	79.0	23,000,000	1,435,000	Average	13.1	82.3	68,740,000	7,186,500

SANITARY ASPECTS OF WATER QUALITY

Rio Grande at Laredo, Texas, Water Plant

Date 1954	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)	Date 1954	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)	Date 1954	Coliform Organisms per 100 c. c.	Total Bacteria per c. c. (plate count)
Jan. 4	110	350	May 10	620	700	Sept. 20	210	600
11	160	450	17	620	800	27	1,100	300
18	62	500	24	38,000	19,400	Oct. 4	11,000	5,200
25	110	450	June 1	1,100	3,800	11	11,000	1,500
Feb. 1	1,100	650	7	930	1,650	18	3,600	900
8	110	600	14	230	400	25	3,600	1,400
15	620	500	21	3,400	14,500	Nov. 1	1,600	750
23	230	700	July 6	2,100	8,000	8	230	400
Mar 1	360	450	12	160	400	15	110	900
8	230	850	19	620	410	22	130	500
15	160	600	26	620	130	29	110	30
22	210	450	Aug. 2	620	1,000	Dec. 6	110	80
29	54	300	9	360	400	13	160	54
Apr. 5	360	850	16	2,300	1,000	20	110	40
12	6,200	4,700	23	910	100	27	360	66
19	6,200	13,550	30	23,000	17,700			
26	21,000	21,500	Sept. 7	11,000	3,150	Total	183,596	144,310
May 3	24,000	9,300	13	2,300	1,300	Average	3,600	2,830

* Rio Grande 5.6 and 8.6 Miles Below Laredo, Texas, R.R. Bridge

Jan. 4	160,000	14,500	May 17	62,000	20,000	Oct. 11	2,400,000	—
11	55,000	15,500	24	110,000	57,000	26	62,000	6,000
18	62,000	5,000	June 1	34,000	9,000	Nov. 1	36,000	1,100
25	62,000	22,000	14	16,000	10,500	8	23,000	850
Feb. 8	380,000	19,500	21	16,000	23,000	15	16,000	1,450
23	240,000	13,000	July 12	380,000	82,500	22	21,000	1,650
Mar. 8	2,300	8,000	26	21,000	5,000	29	11,000	450
15	9,300	8,000	Aug. 2	36,000	10,500	Dec. 6	220,000	3,400
22	110,000	5,000	9	36,000	5,000	13	23,000	2,100
29	380,000	5,000	23	36,000	156,000	20	23,000	2,450
Apr. 5	380,000	64,000	Sept. 7	23,000	2,200	27	36,000	1,800
12	36,000	36,500	13	380,000	11,000			
26	21,000	29,500	18	110,000	9,000			
May 3	23,000	24,500	20	62,000	9,000	Total	6,278,600	717,950
10	110,000	12,000	27	55,000	5,000	Average	153,100	17,950

Rio Grande at Chapeño, Texas

Jan. 11	230	650	July 19	2,400	395	Nov. 1	360	95
25	160	500	26	62	695	8	93	150
Mar. 1	110	550	Aug. 2	110	145	15	360	60
15	360	800	9	93	500	22	93	120
Apr. 26	1,600	2,500	16	620	700	29	160	610
May 3	360	750	30	360	500	Dec. 6	170	255
10	360	700	Sept. 7	3,600	600	13	110	45
17	130	700	13	2,300	150	20	110	65
June 1	360	950	20	1,600	400	27	210	56
7	360	650	27	210	350			
14	210	260	Oct. 4	2,800	6,720			
21	620	700	11	3,600	700	Total	26,911	24,221
July 12	2,400	600	25	230	600	Average	769	692

Rio Grande at Mercedes, Texas, Pumps

Jan. 4	6,200		May 10	3,600		Sept. 13	2,300	
11	3,800		17	3,600		20	3,600	
18	3,600		24	24,000		27	5,500	
25	620		June 1	11,000		Oct. 4	38,000	
Feb. 1	1,600		7	3,600		11	11,000	
8	620		14	1,600		18	3,600	
15	1,100		21	2,300		25	38,000	
23	230		28	24,000		Nov. 1	11,000	
Mar. 1	1,100		July 6	3,600		8	38,000	
8	620		12	6,200		15	3,600	
15	1,100		19	930		22	38,000	
22	620		26	11,000		29	70,000	
29	3,400		Aug. 2	6,200		Dec. 6	11,000	
Apr. 5	3,600		9	11,000		13	24,000	
12	240,000		16	6,200		27	3,600	
19	6,200		23	6,200				
26	6,200		30	3,600		Total	852,740	
May 3	140,000		Sept. 7	2,300		Average	16,720	

* Sampling at point 8.6 miles below Laredo, Texas, Railroad Bridge began September 7, 1954.

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES
In the United States

The monthly records of rainfall, with averages for periods of record, are tabulated below for the stations in the United States in their downstream order. These records have not been published elsewhere. On pages 95 and 96, these same stations are listed in alphabetical order, showing the location, elevation, period of record, type of gage in use, tributary or subdivision of the Rio Grande watershed on which the station is located, and the observer. Records of daily rainfall amounts for 1953 and 1954, where available, are on file in the office of the United States Section of this Commission. For daily records prior to 1953, see previous issues of these bulletins.

	1		2		3		4		5		6		7	
Month	American Dam		Island Station		Fabens-Guadalupe Bridge		County Line		Fort Hancock Bridge		Madden Arroyo		Guayuco Arroyo	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.25	.44	.02	.34	0	.39	.04	.42	.09	.44	.04	.35	.10	.38
Feb.	0	.38	.05	.26	0	.29	0	.22	T	.26	.02	.13	.04	.14
Mar.	.12	.36	.15	.27	.04	.31	0	.31	T	.25	0	.15	0	.16
Apr.	.07	.29	.25	.25	.29	.35	.30	.34	.85	.43	.20	.40	.25	.27
May	.29	.30	1.13	.48	.70	.46	1.29	.40	2.93	.71	1.14	.52	.41	.44
June	.42	.80	.93	.54	.04	.59	.06	.59	.35	.93	.33	.62	.70	.58
July	1.03	1.46	.17	1.00	.54	1.11	.18	1.07	1.73	1.21	.58	1.21	.50	1.58
Aug.	4.14	1.25	2.79	1.24	2.97	1.47	2.79	1.41	5.39	1.38	6.23	1.70	3.06	1.58
Sept.	1.09	.86	.20	.91	.62	1.05	.24	1.03	.24	1.02	.06	.99	.44	1.25
Oct.	.29	.65	1.27	.83	1.12	1.01	.96	.86	1.09	1.00	1.24	1.19	1.03	1.17
Nov.	0	.20	0	.22	0	.21	0	.22	0	.20	0	.15	0	.16
Dec.	.01	.43	0	.42	0	.48	0	.42	0	.51	0	.46	0	.45
Yearly	7.71	7.42	6.96	6.76	6.32	7.72	5.86	7.29	12.67	8.34	9.84	7.87	6.53	8.16

	8		9		10		11		12		13		14	
Month	Fort Quitman		Neely Ranch		Al Roosevelt Ranch		Quebec Ranch		Kelly Ranch		Petan Ranch		Livingston Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	0	.48	.14	.41	.25	.22	0	.32	1.10	.65	.50	.34	0	.08
Feb.	0	.21	0	.11	T	.16	0	.08	0	.06	0	.11	0	0
Mar.	.09	.24	.15	.17	.20	.36	.20	.32	.25	.49	0	.43	0	.12
Apr.	.19	.33	.10	.15	1.35	.42	1.35	.59	.70	.58	0	.26	.35	.12
May	.42	.47	.44	.49	.50	.28	4.95	1.18	1.90	.92	0	.93	.47	.62
June	.46	.80	.03	.73	2.00	.87	2.85	2.02	2.85	1.77	2.80	2.67	3.57	2.06
July	.62	1.45	0	1.52	1.85	2.31	0	1.71	1.00	3.35	1.35	3.86	0	.84
Aug.	3.45	1.34	3.98	1.49	1.75	.64	2.60	1.58	2.70	1.32	5.18	2.28	2.75	1.32
Sept.	.02	1.00	0	1.42	T	.62	0	1.32	0	2.02	.10	1.93	0	.54
Oct.	1.64	.78	2.45	.96	2.30	.91	1.40	.52	.36	.50	.30	.37	2.30	1.85
Nov.	0	.23	0	.14	0	.02	0	.04	0	.08	0	.23	0	.42
Dec.	0	.39	0	.42	0	.48	0	.22	0	.35	0	.34	0	.33
Yearly	6.89	7.72	7.29	8.01	10.20	7.29	13.35	9.90	10.86	12.09	10.23	13.75	9.44	8.30

	15		16		17		18		19		20		21	
Month	Presidio (IB&WC Gage)		Bloys Camp		Marfa Experiment Station		Kerr Mitchell Ranch		Joe Lane Ranch		Loma Vista Ranch		H. T. Fletcher Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.16	.17	.65	.54	.33	.32	.34	.53	.14	.07	.30	.88	.49	.83
Feb.	0	.10	T	.42	.06	.16	.15	.09	0	0	0	.13	T	.12
Mar.	.01	.26	1.20	.48	.06	.42	0	.19	0	0	0	.17	T	.32
Apr.	.47	.23	2.10	.63	1.75	.52	.97	.69	.74	.44	1.72	.86	1.34	.59
May	.77	.35	2.80	1.68	.39	.93	.40	1.06	.15	.20	.90	1.07	.42	1.20
June	1.88	1.13	6.70	2.79	2.12	1.74	2.13	1.88	2.51	1.46	3.13	1.95	2.17	1.50
July	.58	1.59	.80	3.10	.56	2.19	.25	2.07	.82	1.52	.70	2.20	1.32	2.67
Aug.	2.03	.72	5.60	3.52	2.92	1.48	2.29	2.14	6.63	4.48	1.55	1.62	4.66	3.09
Sept.	.12	.53	.30	2.83	.16	1.28	.23	1.73	.18	.09	0	1.80	.19	1.53
Oct.	.21	.36	1.20	1.49	.85	.34	.33	1.24	0	.05	0	1.22	T	1.32
Nov.	0	.10	0	.39	.01	0	0	.21	0	0	0	.33	.01	.31
Dec.	0	.21	T	.62	0	.23	0	.48	0	.08	0	.62	T	.40
Yearly	6.23	5.75	21.35	18.49	9.21	9.61	7.09	12.31	11.17	8.39	8.30	12.85	10.60	13.88

	22		23		24		25		26		27		28	
Month	Sauz Ranch		McFarland Ranch		N. B. Chaffin Ranch		A. L. Baugh Ranch		San Jacinto Ranch		McCracken Ranch		H. M. Greenwood (Cienega Ranch)	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.36	.60	.53	.86	.15	.48	.10	.66	.30	.81	.28	.61	.22	.56
Feb.	T	.09	0	.19	0	.18	0	.07	0	.12	0	.12	0	.10
Mar.	.03	.46	0	.39	0	.36	0	.28	2.45	2.10	.04	.19	.05	.21
Apr.	1.32	.32	1.09	.70	.75	.49	.17	.35	0	0	.69	.58	1.21	.76
May	.37	1.21	.62	1.45	0	.69	1.77	.80	0	0	.69	.81	.28	.85
June	1.81	1.24	1.13	1.10	1.00	1.46	1.85	1.31	3.00	1.50	2.63	1.36	2.59	1.74
July	.89	2.74	1.00	3.09	0	1.55	0	1.90	0	.98	1.36	2.41	.11	1.92
Aug.	6.84	2.38	3.90	2.57	1.10	1.41	.68	1.76	7.15	5.28	3.74	2.17	2.96	1.95
Sept.	.16	1.92	1.05	2.07	.15	1.76	0	1.32	1.16	.98	1.38	1.78	0	2.27
Oct.	.05	1.37	.10	1.34	0	.13	0	.84	0	0	1.02	1.20	1.00	1.22
Nov.	T	.30	0	.39	0	.26	0	.29	0	0	0	.28	0	.25
Dec.	.01	.49	.10	.64	0	.54	0	.58	0	0	0	.55	0	.60
Yearly	11.84	13.12	9.52	14.79	3.15	9.31	4.57	10.16	14.06	11.77	11.83	12.06	8.42	12.43

	29		30		31		32		33		34		35	
Month	Redford		Mariposa Mine		Van Eman Ranch		02 Ranch		Terlingua Creek Station		Castalon Ranger Station		Johnson Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.			.14	.05	0	.35		.54	.19	.10	0		.07	.46
Feb.			T	.60	0	.08		.37	0	0	0		0	.12
Mar.			0	.32	.10	.44		.46	0	.32	0	.59	0	.20
Apr.			1.70	.57	T	.33		.43	1.31	1.05	1.71	.92	2.15	.55
May			.75	.27	.40	.50		1.13	.31	.19	.85	.42	1.00	.90
June			1.98	.68	3.36	1.54		1.29	2.37	1.02	1.51	.96	2.42	1.19
July	.20		1.01	1.03	0	2.31		1.62	.48	.99	.20	1.42	.41	1.30
Aug.	1.30		1.35	.49	.95	1.72	2.80	2.85	1.32	.70	2.10	1.57	2.35	.84
Sept.	0		.36	.85	0	1.34		1.85	.20	.35	0	.39	.04	1.34
Oct.	0		.14	.22	0	.29		1.86	0	.26	0		0	.59
Nov.	0		0	0	0	.25		.77	0	.05	0		0	.22
Dec.	0		T	.13	0	.59		.40	0	.32	.02		.02	.34
Yearly			7.43	5.21	4.81	9.74		13.57	6.18	5.35	6.39		8.46	8.05

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES

In the United States

Month	36 Panther Junction		37 Ray Willoughby Ranch		38 J. W. Woodward Ranch		39 Burtrill Ranch		40 Santiago Peak Ranch		41 Kokernot Ranch - Headquarters		42 Kokernot Ranch - No. 2	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.23		0	.17	0		.35	.18	.50	.25	.26	.17	.20	.32
Feb.	0		0	.08	0		0	.06	0	0	0	0	0	.03
Mar.	0		0	.50	0		T	.18	0	.03	0	.24	0	.32
Apr.	1.52		2.84	.95	2.55		2.60	1.05	2.00	1.00	2.20	.86	2.09	.66
May	.81		1.40	1.20	.75		1.10	1.14	.30	.30	.20	.22	.20	.38
June	2.95	1.58	1.95	1.58	1.05		1.35	.64	3.10	1.80	2.77	1.06	2.66	1.03
July	.33	1.71	1.25	3.49	.35		0	.84	.90	.45	1.01	1.36	.90	1.65
Aug.	3.65	2.12	6.41	2.80	3.05		0	.19	4.80	3.35	3.04	1.38	3.18	1.63
Sept.	.13	.44	.90	.78	.20		.50	.20	0	0	0	.28	0	1.89
Oct.	.11	.20	0	.07	.40		.70	.23	0	0	0	.07	0	.52
Nov.	0	0	0	0	0		1.50	.57	0	0	0	.23	0	.12
Dec.	.09	.10	0	.17			0	T	0	0	0	.20	0	.28
Yearly	9.82		14.75	11.79	8.35		8.10	5.28	11.60	7.18	9.48	6.07	9.23	8.83

Month	43 A. M. Potter Ranch		44 Black Gap Game Refuge		45 Persimmon Gap Ranger Station		46 Dove Mountain Ranch		47 Maravillas		48 Garner Ranch		49 Steve Stumberg Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.42	.16	.25	.18	.36	.17	.15	.31	.19	.12	.24	.44	.11	.76
Feb.	0	.01	0	.02	0	.03	0	.20	T	.05	0	.03	0	.20
Mar.	0	.01	0	.37	0	.28	0	.29	T	.39	.02	.20	0	.23
Apr.	1.06	.45	.75	.45	2.22	.91	1.71	.62	2.01	1.06	1.21	.75	2.50	.78
May	.30	.61	.99	1.23	.56	.72	.30	.62	.76	.93	1.28	1.15	2.23	1.94
June	.50	.50	0	.47	3.32	1.44	.90	.89	1.30	1.54	0	1.05	1.34	1.11
July	.50	.75	.90	.51	.58	1.06	.31	.65	.50	.84	0	.62	0	1.86
Aug.	0	.21	1.33	.55	1.30	.62	.66	.22	1.36	1.49	2.01	1.04	.74	1.28
Sept.	3.10	1.27	0	.06	0	.39	0	0	.06	.77	.04	.57	.17	1.97
Oct.	0	0	0	0	.32	.22	0	.40	.17	.40	.87	1.00	.35	1.06
Nov.	0	.10	0	.13	0	.07	0	0	0	.06	0	.07	0	.44
Dec.	0	.10	0	.45	0	.18	0	.38	0	.19	0	.13	0	.81
Yearly	5.88	4.17	4.22	4.42	8.66	6.09	4.03	4.58	6.35	7.84	5.67	7.05	7.44	12.44

Month	50 Cinco de Mayo Ranch		51 McGonagill Ranch - Headquarters		52 McGonagill Ranch - East Mill		53 Arvin and Harkins Ranch - Header		54 Arvin and Harkins Ranch - Bean		55 Arvin and Harkins Ranch - Camel		56 Arvin and Harkins Ranch - Headquarters	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.			0	0	0	0	0	.43	0	.45	0	.27	0	.50
Feb.			0	.06	0	.05	0	.15	0	.07	0	.07	0	.13
Mar.			0	.56	0	.65	0	.45	0	.43	0	.42	0	.40
Apr.	6.69	3.36	1.30	.67	.90	.65	1.30	1.47	1.50	1.45	.90	1.22	1.05	1.26
May		1.30	2.59	1.43	1.85	.95	1.90	1.78	1.60	1.47	1.30	1.38	1.62	2.00
June		.22	1.64	.74	1.30	.43	1.50	1.27	2.40	1.35	3.80	1.05	3.70	1.14
July		.20	.47	1.43	0	.43	0	1.05	0	.95	.10	.78	0	.96
Aug.		0	2.72	1.70	3.25	1.33	0	1.80	0	2.05	0	1.20	0	1.53
Sept.		.98	.42	.41	.70	1.10	1.30	1.13	1.00	.90	.20	.75	.80	.92
Oct.		0	0	.13	0	.23	3.40	1.23	3.50	1.43	2.20	1.13	2.30	1.15
Nov.			0	.23	0	.20	0	.27	0	.14	0	.10	0	.12
Dec.			0	.33	0	.77	0	.28	0	.32	0	.24	0	.25
Yearly			9.14	7.69	8.00	6.79	9.40	11.31	10.00	11.01	8.50	8.61	9.47	10.36

Month	57 Arvin & Harkins Ranch - Monty Corder		58 E. W. Hardgrave Ranch		59 Adams Bros. Ranch		60 Bricker Ranch		61 Dryden		62 Pumpville		63 C. L. Arthur Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	0	.42	.31	.23	.35	.30	.11	.06	.31	.60	.19	.64	.50	.91
Feb.	0	.12	.01	.08	0	.04	0	.04	.01	.38	T	.32	0	.12
Mar.	0	.47	T	.48	.02	.38	0	.46	.03	.41	0	.52	0	.42
Apr.	.60	1.28	1.13	1.38	1.90	1.22	5.34	2.81	2.43	.95	4.97	1.28	1.33	.58
May	.80	1.50	2.44	1.55	2.13	1.44	1.32	1.11	2.18	2.11	3.10	1.95	.38	1.68
June	6.40	1.57	4.32	1.63	4.23	1.52	3.27	1.76	1.20	1.06	7.55	1.81	1.25	1.73
July	0	.65	.30	.32	.37	.30	.41	.28	.23	1.18	0	.38	0	2.38
Aug.	0	.85	.18	.24	0	.43	0	.32	.07	1.30	T	.49	4.48	1.99
Sept.	0	.83	.90	1.16	.06	.74	.81	1.38	.01	1.60	T	1.49	.52	1.46
Oct.	2.30	.98	1.62	.98	.65	.56	.74	.42	.40	1.07		1.46	.25	.80
Nov.	0	.13	0	.14	0	.17	0	.12	0	.36		.10	0	.27
Dec.	0	.25	0	.26	0	.28	0	.28	T	.56		.67	0	.25
Yearly	10.10	9.05	11.21	8.45	9.71	7.38	12.00	9.04	6.87	11.58		11.11	8.71	12.59

Month	64 Ingram Ranch	65 Shumla Bend	66 Pecos River		67 Martin King Rch.	68 Comstock		69 Lucious Hinds Rch.	70 Upper Devils	71 Devils Lake		72 Diablo Dam Site	73 Armistead Ranch	
	1954	1954	1954	Average	1954	1954	Average	1954	1954	1954	Average	1954	1954	Average
Jan.				.87		.19	.70			.29	.70		.16	.15
Feb.				.67		0	.78			T	.69		T	.28
Mar.			0	.71		0	.81			.02	.78		0	1.27
Apr.			5.11	1.54		4.18	1.64			5.67	1.78		5.33	2.38
May			1.87	1.86		.62	1.83			.93	1.58		.37	1.66
June			21.61	2.77		13.25	2.25			11.67	2.37		10.25	3.56
July			.06	1.43		1.06	.99			T	.82		1.20	.64
Aug.			.26	1.63		0	2.23			.11	1.46		T	2.42
Sept.	.68			1.87		.62	1.70	.51	.25	.53	1.55		9.53	4.04
Oct.	1.58			1.12		2.33	1.45	3.60	3.00	2.08	1.40	4.40	3.31	2.00
Nov.	0	0		.44	0	0	.43	0	.10	.34	.59	T	T	.40
Dec.	0	0		.77	0	0	.88	0	0	T	.77	0	T	.38
Yearly				15.68		22.25	15.69			21.64	14.49		30.15	19.18

Month	74 Maverick County Canal Headgate		75 Quemado		76 Maverick Power Plant		77 Tortuga Ranch		78 El Indio		79 Wuensche Farm		80 Cuervo Creek	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.43	.41	1.53	.85	.78	.39	.60	.33	.62	.77		.11	.90	
Feb.	0	1.44	T	1.28	.12	.06	0	.07	0	.65		.48	0	
Mar.	0	.77	0	.76	0	.77	.10	.71	0	.66		.83	T	
Apr.	2.67	1.30	1.52	1.55	2.06	1.10	2.46	.73	3.15	1.16	3.61	1.78	2.72	
May	2.08	1.52	1.78	2.62	2.66	1.33	3.33	3.07	3.79	3.74	4.08	2.93	3.50	
June	4.90	1.77	2.70	1.68	3.48	1.83	3.46	1.07	1.00	1.62	2.13	.80	1.10	
July	0	2.05	.71	1.13	1.14	.59	0	.15	.50	.68	1.65	.67	.40	
Aug.	.95	1.37	3.04	1.69	1.25	2.49	1.22	2.45	0	2.33	.60	.30	.50	
Sept.	.20	2.72	1.66	2.84	.73	1.59	.32	2.28	.35	2.66	0	.88	0	
Oct.	3.61	1.54	2.80	1.55	.96	.91	1.58	.57	1.30	.97	1.05	.54	1.00	
Nov.	.34	.30	.20	.50	.57	.59		.22	.15	.46	.07	.46	0	
Dec.	0	.58	T	.59	0	.18		.10		.69	T	.03	T	
Yearly	14.58	15.77	15.94	17.04	13.75	11.83		11.75		16.39		9.81	10.12	

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES

In the United States

Month	81 Apache Ranch		82 Justapor Ranch		83 Santa Ysabel Farm		84 Laredo Water Plant		85 Fort McIntosh		86 Laredo International Bridge		87 Corralitos Ranch	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.60		.70	.35	.20	.10	.13	.83	.20	.71	.12	.57	.10	.05
Feb.	0		0	.35	0	.34	0	.68	0	.82	0	.61	T	.26
Mar.	T		0	.32	T	.48	.11	.69	.20	.77	.18	.64	.15	.08
Apr.	3.10		1.90	1.90	2.07	1.03	1.80	1.14	1.66	1.35	1.17	1.61	2.10	1.39
May			3.20	2.35	3.15	1.67	3.91	2.58	3.95	2.69	2.63	2.03	1.50	1.40
June			2.00	1.00	.84	.42	1.43	2.15	1.46	2.11		1.95	2.35	1.18
July			.20	.10	T	.04		1.29	.37	1.47		1.36	1.60	.80
Aug.			.60	2.18	.90	6.74		1.52	1.44	1.72		1.25	1.20	4.95
Sept.			.60	.80	.75	1.52		3.00	1.32	2.80		3.13	1.30	.80
Oct.			2.60	2.03	1.92	2.27		1.50	3.07	1.62		1.14	2.90	3.01
Nov.	0	0	0	.27	0	.92		.70	.71	1.13		.45	.30	.15
Dec.	0	.25	0	.28	0	.25		1.04	.13	.89		.61	0	.20
Yearly			11.80	11.93	9.83	15.78		17.12	14.51	18.08		15.35	13.50	14.27

Month	88 Huisache Ranch		89 Zapata Station		90 Arroyo Tigre Chiquito		91 Falcón Dam		92 Roma		93 Rio Grande City Gaging Station		94 HCWCID #6 (Avg. of 3 gages)	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.25		.28				.26	.10	.25	.74	.10	.62	0	.24
Feb.	T		T				.07	.25	.35	.79	0	.60	.21	.61
Mar.	.20		.20				.31	1.11	.22	1.04	0	.99	.19	.38
Apr.	1.85		1.35		2.80		1.87	1.02	3.20	1.35	4.26	1.07	4.07	2.38
May	1.45		3.65	2.28	.55		2.58	2.06	2.26	1.72	1.03	1.35	1.06	1.36
June	1.60		3.15	1.58	2.80		2.36	1.82	2.68	2.38	2.92	2.35	3.43	1.72
July	2.00		1.10	1.28	.10		.58	.40	0	.99	0	.57	.62	.38
Aug.	1.10	3.10	1.70	2.88	.20		1.32	2.99	1.61	2.04	0	1.57	1.30	3.96
Sept.	.75	1.44	.80	1.14	2.20		1.53	2.55	.79	3.39	1.33	2.49	2.75	1.53
Oct.	2.30	3.95	1.10	2.12	1.30		3.30	1.90	3.93	2.52	3.46	1.91	6.23	5.42
Nov.	.50	.25	.80	.40	.60		1.15	.37	2.52	.45	1.31	.42	1.19	.77
Dec.	0	.34	0	.35	0		T	.33	0	.42	.10	.62	0	.36
Yearly	12.00		14.13				15.28	14.90	16.81	17.83	14.51	14.56	21.05	19.11

Month	95 Mission Pump		96 HCWCID #7		97 O. C. Dale Farm		98 HCWCID #15		99 Edinburg Filtration Plant		100 HCWID #6		101 Murse Farm	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	0	.02	.07	.36	.14	.43	0	.16	.17	.22	0	.15	.40	.28
Feb.	.03	.54	.13	.47	.12	.64	0	.39	.05	.52	.18	.59	.25	.63
Mar.	.15	.59	.27	.43	.30	.49	.20	.52	.35	.40	.31	.31	.50	.47
Apr.	3.62	2.07	5.85	2.48	7.22	3.06	4.94	1.90	7.12	2.72	5.30	2.04	6.35	2.42
May	.25	1.38	.56	1.59	.56	1.44	.43	2.05	.46	2.28	.42	1.94	.30	1.67
June	3.46	2.08	4.75	3.08	4.81	3.20	2.94	2.48	4.94	2.46	5.06	2.55	4.65	2.34
July	1.17	1.49	.67	1.04	.56	1.23	1.92	.84	.87	.80	1.80	1.06	.30	.43
Aug.	.46	2.50	1.58	2.56	.86	1.96	1.31	2.46	1.54	1.99	.65	2.14	1.60	4.04
Sept.	.15	.21	1.45	.61	1.78	.87	2.36	1.28	2.30	1.34	3.38	2.38	8.70	5.04
Oct.	10.21	4.88	5.89	3.49	9.72	4.33	5.19	2.35	6.94	3.24	4.13	2.71	3.80	2.87
Nov.	1.11	1.10	1.26	.96	.97	1.00	1.09	.63	.56	.81	.81	1.33	0	1.02
Dec.	0	.48	.22	.55	.30	.62	0	.38	.10	.44	0	.47	0	.32
Yearly	20.61	17.34	22.70	17.62	27.34	19.27	20.38	15.44	25.40	17.22	22.04	17.67	26.85	21.53

Month	102 CCWCID #3 (Avg. of 6 gages)		103 La Feria Pump		104 CCWCID #19		105 San Benito Pump		106 Whipple Farm		107 CCWID #11 (Avg. of 18 gages)		108 Los Fresnos Pump	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.14	.20	0	.20	.10	.18	.15	1.24	.40	.23	0	0	.30	.10
Feb.	.12	.49	0	.28	0	.35	0	.63	.05	.36	0	.23	.15	.43
Mar.	.43	.30	.28	.28	.37	.26	.22	1.07	.23	.23	.54	.37	0	.27
Apr.	6.15	2.47	5.20	2.13	4.90	1.97	3.17	1.16	3.50	1.55	3.83	1.59	3.10	1.53
May	.46	1.92	.32	2.26	.25	1.76	.12	2.60	.28	2.21	.31	1.35	.30	1.58
June	6.51	3.14	4.95	2.78	6.07	3.18	1.78	2.37	2.95	1.66	1.37	1.40	7.50	4.90
July	.70	.67	2.00	1.30	.60	.47	1.53	1.67	2.25	2.58	.69	1.70	1.80	1.98
Aug.	4.40	5.03	3.37	2.73	3.08	3.97	2.79	2.20	1.53	2.84	1.79	4.41	1.25	2.62
Sept.	4.36	4.57	5.57	6.56	2.11	2.88	4.19	3.78	3.65	4.45	2.58	2.90	7.00	5.12
Oct.	5.80	3.41	10.70	5.35	5.06	2.47	9.93	2.28	6.30	2.83	7.81	3.36	12.90	5.73
Nov.	.76	1.76	.32	1.39	.58	1.43	.55	.82	4.50	2.72	2.56	2.26	.95	2.12
Dec.	0	.52	0	.40	0	.53	0	1.44	.18	.55	0	.47	0	.39
Yearly	29.83	24.48	32.71	25.66	23.12	19.45	24.43	21.26	25.82	22.21	21.48	20.04	35.25	26.77

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES
In Mexico

The monthly records for Mexican rainfall stations, with averages for their periods of record, are tabulated below in their downstream order. These records have not been published elsewhere. On page 96, the same rainfall stations are listed in alphabetical order, showing the location, elevation, period of record, type of gage in use, tributary or subdivision of the Rio Grande watershed on which the station is located, and the observer. Records of daily rainfall at stations operated by the Mexican Section of this Commission appear in their issue of Water Bulletin No. 24. For all other Mexican stations, the daily records are on file in the office of the Mexican Section.

Month	109 San Antonio, Durango		110 Parral, Chih.		111 Belleza, Chih.		112 La Boquilla, Chih.		113 Ojo Caliente, Chih.		114 Rosetilla, Chih.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	0	.33	0	.15	.14	.28	T	.30	0	.07	0	.48
Feb.	.06	.05	.08	.18	.09	.40	.05	.14	T	.02	.14	.06
Mar.	0	.05	0	.13	0	.08	0	.17	0	.21	0	.18
Apr.	.57	.29	2.56	.20	T	.20	.49	.18	.38	.13	1.50	.21
May	1.26	.47	T	.32	T	.15	.04	.61	1.98	.39	0	.25
June	1.59	2.01	1.42	1.60	2.39	1.22	2.42	1.49	1.42	1.77	.34	1.34
July	3.69	4.27	2.68	4.21	3.81	4.52	2.07	2.97	2.17	3.52	1.67	2.41
Aug.	6.42	3.34	5.59	3.95	5.46	4.45	4.89	2.91	3.10	2.13	5.28	2.44
Sept.	.81	3.31	1.38	4.07	3.81	3.46	.74	2.92	1.00	2.27	.76	2.17
Oct.	.10	1.02	2.05	1.22	.52	.70	.37	.95	.26	.97	.39	.86
Nov.	0	.24	T	.60	0	.57	0	.38	0	.08	0	.20
Dec.	0	.30	0	.46	.06	.46	T	.41	T	.24	0	.35
Total	14.50	15.68	15.76	17.09	16.28	16.49	11.07	13.43	10.31	11.80	10.08	10.95

Month	115 Villalba, Chih.		116 Las Vírgenes, Chih.		117 Delicias, Chih.		118 Guerrero, Chih.		119 La Junta, Chih.		120 Cuauhtémoc, Chih.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1923	1924
Jan.	T	.36	T	.24	T	.39	.49	.55	1.33	.99		.20
Feb.	.12	.09	.03	.03	.14	.11	.06	.42	.20	.56		.67
Mar.	0	.04	0	.05	0	.13	T	.20	.17	.29		0
Apr.	.89	.12	.26	.12	.84	.22	T	.18	.13	.20		.39
May	.57	.19	.07	.16	T	.21	T	.24	T	.26		.75
June	1.33	.92	.24	1.00	.57	1.14	2.28	1.66	.44	1.59	1.06	.08
July	3.79	3.57	1.88	2.31	3.94	2.38	6.61	4.46	6.71	5.16	4.06	4.67
Aug.	5.80	2.51	4.41	1.92	10.16	2.46	7.06	4.93	5.96	4.97	7.87	5.35
Sept.	.53	2.67	1.02	1.58	1.72	2.09	2.60	3.22	2.26	2.32	2.83	.94
Oct.	.46	1.18	.30	.64	.43	.83	2.76	1.21	1.33	1.30	.75	.20
Nov.	0	.19	0	.14	0	.26	.02	.53	0	.35	1.30	T
Dec.	T	.40	.02	.40	T	.40	T	.72	.03	.84	1.65	1.14
Total	13.49	12.24	8.23	8.59	17.80	10.62	21.88	18.32	18.56	18.83		14.39

Month	120 Cuauhtémoc, Chihuahua											
	1925	1926	1927	Avg. 1928	1929	1943	1944	1945	1946	1947	1948	1949
Jan.	0	T	0	.59	0	.39	T	0	.91	1.30	0	1.85
Feb.	.12	.26	T	.28	.06	0	.63	T	0	0	T	T
Mar.	.91	.18	.24	.48		0	T	0	T	.12	0	0
Apr.	0	1.08	0	0		0	0	0	1.73	0	T	T
May	.87	.14	.53	.16	T	0	0	0	T	.24	T	T
June	4.86	.98	.31	1.10		1.46	2.85	.98	2.95	1.50	4.17	1.26
July	8.78	6.61	5.81	2.72	No	8.15	3.44	6.85	5.24	2.80	2.80	5.31
Aug.	5.35	5.55	3.27	8.71	further	4.29	3.78	.75	5.16		1.38	.87
Sept.	1.81	5.26	2.30	1.56	record	4.21	3.78	.94	2.22	1.57	.16	6.22
Oct.	2.85	3.03	.75	.16	until	.59	.43	4.61	2.22	.75	1.30	1.34
Nov.	.37	0	.08	.63	1943	.18	T	0	0	.43	T	0
Dec.	.87	.20	0	.30		1.57	.85	0	T	T	.35	.71
Total	26.79	23.29	13.29	16.69		20.84	15.76	14.13	20.43		10.16	17.56

Month	120 Cuauhtémoc, Chihuahua						121 Cusihuiriachic, Chihuahua					
	1950	1951	1952	1953	1954	Average	1941	1942	1943	1944	1945	1946
Jan.	0	0	0	0	0	.29		T	.04	.35	.14	.63
Feb.	0	0	.12	T	.24	.13		.75	0	.54	.10	.16
Mar.	T	.12	.08	0	T	.13		.79	0	.06	0	.02
Apr.	T	.31	.43	T	T	.23		.28	0	0	0	.87
May	.08	T	.31	.31	T	.19		T	.24	.06	.04	T
June	1.14	T	1.85	T	1.38	1.55		.31	1.65	1.95	T	1.73
July	5.71	2.20	3.50	6.02	3.31	4.89		2.13	6.88	3.29	8.05	2.95
Aug.	1.46	2.24	2.52	2.68	8.19	4.08		11.58	6.73	3.03	2.76	5.53
Sept.	4.06	1.61	.28	.35	1.77	2.33		4.61	6.57	5.51	.61	3.62
Oct.	.75	T	0	.63	1.38	1.21	1.70	1.34	0	.43	3.48	1.71
Nov.	0	.63	.04	0	0	.20	.49	.08	.57	.22	0	.98
Dec.	0	.67	.12	T	.04	.47	.54	T	1.67	.85	.18	.08
Total	13.20	7.78	9.25	9.99	16.31	15.70		21.87	24.35	16.29	15.36	18.28

Month	121 Cusihuiriachic, Chih.		122 Chihuahua, Chih.		123 Las Burras, Chih.		124 Maclovio Herrera, Chih.		125 Cuchillo Parado, Chih.		126 Ojinaga, Chih. (M. S. M.)	
	1947	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.37	.26	T	.29	T	.05	T	.35	.10	.07	.24	.24
Feb.	0	.26	.11	.21	.04	.06	T	.11	T	.08	0	.16
Mar.		.17	T	.23	0	.21	0	.27	T	.28	T	.20
Apr.		.23	T	.18	.36	.15	T	.26	.06	.10	.67	.25
May		.07	.92	.37	.41	.40	T	.66	1.15	.71	.51	.53
June		1.13	1.55	1.48	1.49	1.29	.31	1.63	1.30	.98	1.42	.79
July	3.46	4.46	1.42	3.46	.73	2.95	.96	3.10	.84	2.42	.75	1.14
Aug.	8.07	6.28	6.85	3.41	5.35	2.10	4.48	3.14	6.29	1.94	2.87	1.31
Sept.	0	3.49	.74	3.09	.66	1.57	.48	3.77	.96	.42	.16	1.13
Oct.	1.46	1.45	.97	.88	.99	.34	1.30	.69	.50	.12	.20	.87
Nov.		.39	0	.48	0	.05	0	.12	0	.13	0	.41
Dec.		.55	T	.40	.02	.17	0	1.03	T	.17	T	.40
Total		18.74	12.56	14.48	10.05	9.34	7.53	15.13	11.20	7.42	6.82	7.43

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES

In Mexico

Month	127 Ojinaga, Chih. (I.B.&W.C.)		128 Cd. Acuña, Coah.		129 Palestina, Coah.		130 Jiménez, Coah.		131 Piedras Negras, Coah.		132 Allende, Coah.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.			.20	.32	0	1.17	.96	.35	1.59	.46	.41	.49
Feb.			.02	.11	0	1.02	.09	.62	.04	.16	.28	1.42
Mar.			T	1.10	0	.73	0	1.34	.01	1.03	T	.59
Apr.	.30		3.44	1.22		1.56	1.75	1.24	2.89	1.00	3.58	1.04
May	.18		1.59	1.84		3.01	1.57	2.32	3.07	2.62	4.09	2.73
June	1.20		6.54	2.02		2.10		.86		.32	2.09	2.10
July	.33		.57	.14	Dis-	2.16		.15		.20	.51	.98
Aug.	2.11		.31	1.32		2.44	1.90	2.55	1.44	2.32	1.97	2.25
Sept.	.12		5.61	2.35	continued	3.16	1.46	1.91	.41	1.32	T	2.28
Oct.	.12		2.80	1.16		1.31	1.43	1.37	1.88	1.42	.89	1.19
Nov.	0		.06	.23		.71	.31	.37	.11	.43	.73	.31
Dec.	0		T	.36		1.06	0	.57	T	.44	T	.36
Total			21.14	12.17		20.43		13.65		11.72	14.55	15.74

Month	133 Villa Hidalgo, Coah.		134 Nuevo Laredo, Tamps.		135 Cuatro Ciénegas, Coahuila							
	1954	Average	1954	Average	1923	1924	1925	1926	1927	1928	1929	1930
Jan.	.79	.20	.18	.72		.12	T	.31	0	.34	0	0
Feb.	.08	.25	0	.72		.16	0	T	.65	.98	0	.20
Mar.	.12	.60	T	.77		0	.20	T	T	T	0	T
Apr.	5.33	1.54	1.82	1.16		.07	.02	.15	.08	0	0	.18
May	5.18	3.12	3.31	2.36		1.50	.22	1.06	.49	.10	.79	.89
June	.47	.67	2.91	1.91	.31	.70	T	1.30	2.16	.10	.39	1.08
July	.16	.04	1.54	1.36	.20	.87	2.05	.24	T	0	1.18	T
Aug.	.10	1.09	.93	1.16	.70	0	.31	1.05	T	1.67	.24	T
Sept.	.53	1.49	1.43	2.65	3.07	.53	.21	0	T	1.67	.47	0
Oct.	2.54	1.42	3.12	1.30	.59	0	1.47	.44	T	T	.59	3.44
Nov.	.39	.37	.39	.77	1.61	0	T	.34	.10	T	.30	.89
Dec.	T	.41	.20	1.01	2.59	.51	.55	.17	.20	.24	T	1.08
Total	15.69	11.20	15.83	15.89		4.46	5.03	5.06	3.68	5.10	3.96	7.76

Month	135 Cuatro Ciénegas, Coahuila											
	1931	1932	1933	1934	1942	1943	1944	1945	1946	1947	1948	1949
Jan.	1.87	.39	T	T	.02	1.50	.09	.14	1.00	1.06	.04	.32
Feb.	.39	.10	T	T	1.28	.10	T	1.04	.17	0	0	.83
Mar.	0	0	T	0	T	T	.54	.02	T	.17	.37	0
Apr.	.33	0	0	.34	T	.17	0	.19	.10	0	.69	.85
May	2.26	.10	.10	T	.13	1.61	.54	.19	.87	.89	.03	4.15
June	.24	T	.83	T	.07	.93	.53	.25	.07	2.64	1.32	.98
July	.10	.16	1.08	.49	.06	.32	.37	1.74	.59	.08	4.49	1.72
Aug.	T	.74	1.03	No	.14	T	6.29	1.20	.89	2.89	.10	1.48
Sept.	0	1.38	1.18	record	2.43	2.78	1.42	1.26	.53	.72	2.39	2.24
Oct.	.22	T	T	until	.34	1.41	.67	.52	2.10	.10	1.10	.89
Nov.	0	.24	0	1942	T	.41	1.20	0	.85	T	.23	0
Dec.	1.67	T	T		0	.59	.16	T	.94	.19	T	1.14
Total	7.08	3.11	4.22		4.47	9.82	11.81	6.55	8.11	8.74	10.76	14.60

Month	135 Cuatro Ciénegas, Coahuila						136 Castaños, Coahuila					
	1950	1951	1952	1953	1954	Average	1932	1933	1934	1935	1936	
Jan.	.33	T	0	0	T	.31		.09	.39	2.56	.08	No
Feb.	.16	.16	.02	.98	T	.30		1.83	.63	.24	T	further
Mar.	T	.17	T	.12	T	.07		.08	.39	.31	.55	
Apr.	1.14	.13	.31	.20	1.77	.28		.51	.49	.24	.47	record
May	2.11	1.44	.60	T	2.22	.93		.39	.51	.83	3.11	
June	.45	.53	2.02	T	.16	.68		2.35	.08	5.47		until
July	3.51	.06	T	T	.07	.78		3.22	1.69	1.57	1.54	
Aug.	.79	.22	0	.91	.22	.87		2.91	.55	.08	2.36	1945
Sept.	.81	1.65	.01	.98	T	1.07		6.28	3.23	3.86	2.36	
Oct.		1.48	0	2.72	T	.79	.93	1.81	.12	T	0	
Nov.	T	.26	.23	T	0	.28	T	.31	0	T	.16	
Dec.	0	.37	.21	.55	.18	.47	T	0	.35	1.42	.55	
Total		6.47	3.40	6.46	4.62	6.83		19.78	8.43	16.58		

Month	136 Castaños, Coahuila										
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	Average
Jan.	.20	1.38	.75	T	.83	T	.12	T	0	T	.46
Feb.	.12	.20	0	.08	1.63	T	T	T	1.14	T	.42
Mar.	T	T	.43	.08	T	T	.67	2.17	T	0	.33
Apr.	.31	T	.08	.26	1.97	1.44	T	.47	.12	1.22	.54
May	.67	1.51	.43	1.30	4.47	3.05	1.65		.24	3.03	1.63
June	.55	2.03	2.68	2.68	3.14	1.32	.96	3.13	T	4.22	2.20
July	2.36	.22	1.00	.75	2.05	.63	2.54	.67	.43	.94	1.40
Aug.	1.46	4.25	2.68	.71	1.43	2.48	T		4.06	1.42	1.88
Sept.	3.19	1.85	1.46	3.74	1.46	1.32	3.52		.55	.51	2.56
Oct.	3.07	8.31	T	1.32	1.85	0	1.06		1.93	1.26	1.55
Nov.	0	1.02	.20	.22	0	0	.55	.08	T	.20	.18
Dec.	.31	1.12	.28	T	.79	0	0	.28	.16	.28	.37
Total	12.24	21.89	9.99	11.14	19.62	10.24	11.07		8.63	13.08	13.52

RAINFALL ON THE RIO GRANDE WATERSHED
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Month	137 Monclova, Coah.		138 San Buenaventura, Coah.		139 Progreso, Coah.		140 Nueva Rosita, Coah.		141 Sabinas, Coah.		142 Villa Juárez, Coah.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.14	.44	T	.62	.20	.46	.43	.70	.49	.73	.24	.58
Feb.	.44	.45	.16	.44	.16	.33	0	.44	.39	.85	0	.35
Mar.	0	.30	0	.21	T	.27	0	.36	0	.57	0	.25
Apr.	1.22	.56	1.22	.57	2.82	1.55	2.76	1.23	2.01	1.29	3.41	1.17
May	1.13	1.48	1.85	1.44	6.39	2.57	1.99	2.66	1.69	2.90	3.62	1.85
June	2.13	1.20	.88	1.61	1.06	1.56	.63	1.89	1.48	2.18	.83	1.21
July	1.02	1.56	.70	1.64	.89	.65	.47	1.46	.49	1.29	1.32	.58
Aug.	1.57	1.64	.67	1.90	.58	2.15	T	1.83	.19	2.52	.16	1.78
Sept.	.41	2.81	.56	1.99	.72	2.60	.67	2.24	.10	3.42	.85	3.04
Oct.	.08	1.19	.33	1.28	.90	1.86	T	1.50	.13	1.67	.14	1.81
Nov.	.12	.55	.14	.47	1.35	.31	0	.47	.79	.42	T	.46
Dec.	.21	.58	.16	.70	.16	.61	T	.69		.59	T	.37
Total	8.47	12.76	6.67	12.87	15.43	14.92	6.85	15.47		18.43	10.57	13.45

Month	143 Don Martín, Coah.		144 Laguna de Salinillas, N. L.		145 Anáhuac, N. L.		146 Joya, Coahuila					
	1954	Average	1954	Average	1954	Average	1927	1928	1929	1930	1931	1932
Jan.	.52	.78	.53	.64	.42	.72		.74	0	T	1.06	.16
Feb.	.16	.63	.10	.64	.33	.48		.43	0	.38	.57	.02
Mar.	0	.60	0	.65	.06	.69		.23	0	0	0	.33
Apr.	2.09	1.26	3.27	1.01	3.14	1.16		T	T	.29	.47	T
May	5.02	2.37	2.48	2.43	3.62	2.62		1.38	.46	.94	1.28	T
June	1.54	1.80	.28	1.26	.59	1.49		.13	.03	1.28	.81	.03
July	.31	1.01	.08	.53	.47	1.27		2.11	1.00	1.83	.80	1.48
Aug.	.22	1.92	.18	3.22	.14	1.96	1.32	.31	.47	.33	1.57	1.69
Sept.	1.42	2.80	.73	2.12	.35	2.68	.73	2.28	1.59	.22	.39	2.52
Oct.	1.38	1.59	.63	1.49	1.50	1.44	.74	.26	.44	3.59	T	2.76
Nov.	.75	.56	.33	.37	.38	.44	.39	.04	.82	2.02	T	T
Dec.	.10	.76	.10	.50	.06	.80	.85	T	.39	1.40	.21	T
Total	13.51	15.98	8.71	14.86	11.06	15.75		7.91	5.20	12.28	7.16	8.99

Month	146 Joya, Coahuila					147 Guerrero, Tamps.		148 Cd. Miguel Alemán, Tamps.		149 Rayones, N. L.	
	1933	1934	1935	1936	Average	1954	Average	1954	Average	1954	Average
Jan.	T	0	2.72	.32	.56	.26	.63	.47	.12	T	.39
Feb.	.30	.18	.16	.20	.25	.12	.60	.04	.24	.76	.43
Mar.	T	0	T	0	.06		.88	.24	1.31	0	.40
Apr.	T	.02	T	5.04	.65		1.43	3.74	1.35	1.71	.79
May	0	1.71	.20	.24	.69		2.63	3.58	2.13	2.44	1.32
June	1.50	T	4.61	.10	.94		1.54	2.91	2.18	.73	2.26
July	1.42	2.59	1.19	1.64	1.56		1.19	.12	.88	1.20	1.05
Aug.	.83	.31	.98		.87		2.51	1.50	3.09	.75	3.21
Sept.	1.73	3.19	7.01		2.18		3.16	1.52	4.03	2.83	2.78
Oct.	0	.24	.46		.94		1.56	4.45	3.51	4.48	1.77
Nov.	0	.08	.48		.43		.51	2.72	.87	0	.33
Dec.	0	.08	.31		.36		1.00	T	.28	T	.27
Total	5.78	8.40	18.12		9.49		17.64	21.29	19.99	14.90	15.00

Month	150 Montemorelos, N. L.		151 Laguna de Sánchez, N. L.		152 Villa Allende, N. L.		153 Santa Catarina, N. L.		154 Monterrey, N. L.		155 Las Comitas, N. L.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	1.61	.84	T	.50	2.52	.98	.03	.99	1.63	.67	.09	.33
Feb.	1.06	.86	.55	.47	1.02	.97	.16	.39	.73	.62	.24	.28
Mar.	0	1.15	0	.63	T	1.39	0	.36	T	.78	0	.38
Apr.	1.90	2.13	2.60	1.36	1.70	2.16	.71	.69	.79	1.17	1.21	.94
May	2.15	2.72	1.57	1.66	2.26	2.97	.17	.61	.83	1.57	.38	.80
June	.08	3.61	1.75	3.52	1.02	4.86	0	2.20	.88	2.83	.14	2.60
July	.12	2.06	.47	2.59	2.08	2.58	.35	1.32	.30	2.44	1.19	1.47
Aug.	1.23	4.12	2.05	4.95	1.50	5.28	.76	3.12	1.43	3.09	2.97	3.83
Sept.	3.91	5.11	2.07	5.36	3.35	6.71	.41	2.99	.60	5.61	1.72	4.40
Oct.	4.37	3.59	8.21	3.33	8.08	5.83	2.84	1.88	3.74	3.25	6.15	2.38
Nov.	4.04	1.60	.41	.31	3.60	1.26	.35	.36	1.38	1.31	.52	.33
Dec.	0	.99	0	.48	T	1.03	T	.71	T	.81	0	.47
Total	20.47	28.78	19.68	25.16	27.13	36.02	5.78	15.62	12.31	24.15	14.61	18.21

Month	156 Villa de Santiago, N. L.		157 Cadereyta, N. L.		158 Las Enramadas, N. L.		159 El Cuchillo, N. L.		160 Gral. Bravo, N. L.		161 Gral. Cepeda, Coah.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	1.63	.88	.96	.80	.04	.96	.05	.79	.15	.74	.02	.50
Feb.	1.46	.94	1.01	.90	.21	.62	.04	.52	.06	.41	0	.41
Mar.	0	1.14	0	1.35	.10	.70	T	.45	.42	.63	0	.28
Apr.	.87	1.66	3.45	2.02	.89	1.61	1.71	1.61	1.97	1.54	.61	.37
May	1.81	2.64	1.07	2.24	1.50	2.93	2.54	1.88	3.82	2.60	.60	.77
June	.94	5.11	.99	3.57	1.38	3.53	.94	2.40	2.54	2.68	1.20	2.32
July	.61	3.04	2.52	2.49	1.67	2.26	2.56	1.51		2.50	1.20	3.63
Aug.	3.56	5.33	3.07	3.65	6.40	3.45	2.72	3.28		2.62	2.16	2.96
Sept.	2.54	8.50	1.48	4.52	1.27	5.07	.51	3.59	1.38	3.53	.96	2.99
Oct.	12.46	5.38	2.58	3.17	3.61	2.55	2.59	2.28	2.80	1.91	.81	1.33
Nov.	2.80	1.34	.98	1.22	.73	.62	.91	.39	.35	.84	.20	.48
Dec.	0	.99	T	.76	0	.72	T	.45	0	.81	.01	.58
Total	28.68	36.95	18.11	26.69	17.80	25.02	14.57	19.15		20.81	7.77	16.62

RAINFALL ON THE RIO GRANDE WATERSHED
IN INCHES

In Mexico

Month	162 Reata, Coahuila						163 Saltillo, Coah.		164 Ramos Arizpe, Coah.		165 Rinconada, N. L.	
	1944	1945	1946	1947	1948	Average	1954	Average	1954	Average	1954	Average
Jan.		1.19	0	.59	.28	.52	.31	.59	0	.44	T	.23
Feb.		1.40	0	0	.14	.38	.28	.49	.31	.33	.16	.40
Mar.		0	0	0	.98	.24	.02	.38	T	.32	0	.26
Apr.		.20	.79	1.26	0	.56	1.52	.73	.71	.48	.28	.67
May		1.36	0	.51	.85	.68	.90	1.00	1.97	.74	.08	.44
June		.33	2.46	1.97	2.01	1.69	.51	2.11	.28	1.14	.10	1.03
July	.44	.61	0	1.81	2.28	1.03	1.78	2.71	1.33	1.44	.47	.45
Aug.	1.44	1.44	1.77	3.31	6.81	2.95	.55	2.34	.41	1.39	.47	1.63
Sept.	.87	.47	1.95	1.20		1.12	.71	2.50	.24	1.72	.08	1.70
Oct.	0	T	1.24	0		.31	.85	1.25	1.46	.67	1.30	.92
Nov.	.14	0		.08		.07	T	.91	.06	.44	.12	.20
Dec.	.02	.08	.39	.28		.19	.12	.65	.12	.56	T	.26
Total		7.08		11.01		9.74	7.55	15.66	6.89	9.67	3.06	8.19

Month	166 Ciénaga de Flores, N. L.		167 Topo Chico, N. L.		168 Higueras, N. L.		169 Los Ramones, N. L.		170 Los Herreras, N. L.		171 Cerralvo, N. L.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.14	1.22	.61	.57	0	.78	.08	.59	.13	.61	.70	.69
Feb.	.85	.56	.57	.79	.53	.56	.16	.62	.05	.50	.19	.53
Mar.	0	.88	0	.77	0	.60	T	.74	.02	.74	.01	.83
Apr.	.96	1.06	.57	1.16	1.46	1.19	1.10	1.99	2.89	1.58	6.43	1.85
May	3.64	2.03	.69	1.07	1.77	1.71	6.59	2.17	5.19	2.86	5.43	3.25
June	1.37	2.64	0	2.19	.54	2.57	1.02	3.06	1.37	3.04	.53	2.64
July	.94	1.99	.43	1.43	.87	2.12	2.36	2.00	1.27	1.31	2.23	1.41
Aug.	1.98	4.63	.56	3.35	1.48	3.02	.83	3.92	1.85	2.85	2.43	3.88
Sept.	T	4.49	0	4.30	1.22	4.23	3.74	4.08	2.37	3.92	1.11	4.77
Oct.	1.70	2.03	1.81	2.22	1.32	1.71	4.45	2.48	4.37	2.34	3.22	2.45
Nov.	.74	.65	.71	.81	.28	.79	.47	.36	.39	.44	2.79	.56
Dec.	.43	.73	0	.68	0	.70	T	.26	.05	.46	0	.40
Total	12.25	22.91	5.95	19.34	9.47	19.98	20.80	22.27	19.95	20.65	25.07	23.26

Month	172 Comales, Tamps.		173 Anzaldúas, Tamps.		174 Camargo, Tamps.		175 San Miguel de Camargo, Tamps.		176 Río Bravo, Tamps.		177 Reynosa, Tamps.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.47	.70	.10	.14	.18	.13	.18	.09	.11	.28	.11	1.00
Feb.	0	.60	.01	.43	T	.58	0	0	.10	.29	.18	.44
Mar.	.16	.77	0	.95		1.87	.22	1.16	.35	.41	.38	.62
Apr.	4.16	1.60	2.70	1.97	6.56	3.38	6.36	3.67	6.52	2.00	3.78	1.12
May	2.48	1.92	.67	.44	1.75	1.07	.61	.53	.43	1.65	1.18	2.61
June	3.40	2.09	3.20	1.61	3.78	1.90	4.57	2.28	5.12	3.44	3.52	2.05
July	.44	1.06	.79	.67	.85	.60	.20	.15		1.98	2.30	1.42
Aug.	.31	2.70	.03	3.22	.51	2.08	.91	2.58		2.81	1.30	1.81
Sept.	.87	3.05	4.44	2.34	.26	.26		0		2.73	3.35	2.54
Oct.	4.72	2.17		4.94		6.48		7.58		1.63	12.48	2.66
Nov.	1.53	.46	.83	.58	1.50	.77	.20	.20	.59	.76	1.65	.75
Dec.	.04	.71	0	.26	T	.20	0	.22		.32	.13	.65
Total	18.58	17.83		17.55		19.32		18.46		18.30	30.36	17.67

Month	178 Retamal, Tamps.		179 Control (C1-K-9), Tamps.		180 Matamoros, Tamps.		181 Valle Hermoso, Tamps.		182 Méndez, Tamps.		183 Linares, N. L.		184 Villagrán, Tamps.	
	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average	1954	Average
Jan.	.10	.30	.16	1.09	.59	1.44	.12	.28	.18	.87	3.49	1.01	1.56	.42
Feb.	.14	.29	0	.59	0	.94	.54	.50	T	.53	.57	.82	.85	.78
Mar.	.58	.72	.30	.81	.35	1.04	0	.42	.14	1.03	.02	1.20	T	1.01
Apr.	6.14	1.55	5.44	1.18		1.43	1.55	.58	.85	1.16	1.60	2.38	4.69	2.78
May	.55	2.07	2.61	2.93		2.85	.80	3.45	.71	3.02	1.97	3.44	6.24	5.26
June	4.17	3.14	3.25	2.25		3.32	3.78	3.64	2.89	2.60	.58	3.66	.16	4.14
July	.51	.87	.41	1.06	Dis-	2.14	.19	1.44	.70	.99	2.30	2.97	1.71	2.38
Aug.	2.64	2.11	3.25	3.02		2.09	2.11	2.01	1.12	4.01	1.72	3.38	5.39	6.73
Sept.	3.82	2.63	8.52	4.58	continued	5.10	3.75	4.93	3.01	3.56	4.48	6.21	1.89	5.97
Oct.	10.24	2.91		2.01		2.82	3.38	3.33	3.38	2.05	5.32	3.28	5.18	3.67
Nov.	.83	.74	1.57	1.13		1.48	.20	.41	1.80	.39	2.03	1.24	3.11	.90
Dec.	.12	.40	0	.58		1.78	0	.10	0	.45	0	1.00	T	.30
Total	29.84	17.73		21.23		26.43	16.42	21.09	14.78	20.66	24.08	30.59	30.78	34.34

AVERAGE RAINFALL ON SUBDIVISIONS OF THE RIO GRANDE WATERSHED IN INCHES

With Totals and Averages for the 84 Years 1871-1954, Inclusive

The precipitation records of all stations on or adjacent to the watershed subdivisions listed below have been used, with proper weighting for area, in calculating the average rainfalls shown here. The hundreds of individual records are delineated in the various "Indexes to Precipitation Records" shown in Water Bulletins Numbers 10, 14, and 22.

Watershed Subdivision	Drainage Area	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
El Paso to Fort Quitman	2,723 Sq. Mi.	1954	.08	.02	.06	.22	1.31	.53	1.07	4.59	.53	1.02	0	T	9.43
		Total	38.60	31.25	28.63	25.29	35.51	68.48	200.57	165.58	117.13	76.73	37.50	52.88	878.15
		Average	.46	.37	.34	.30	.42	.82	2.39	1.97	1.39	.91	.45	.63	10.45
Fort Quitman to Upper Presidio	3,010 Sq. Mi.	1954	.14	.01	.15	.62	.68	1.68	.57	3.73	.07	1.68	0	0	9.33
		Total	32.43	20.76	22.18	32.63	51.41	102.58	271.69	208.51	163.88	82.68	33.66	48.30	1,070.71
		Average	.39	.25	.26	.39	.61	1.22	3.23	2.48	1.95	.98	.40	.58	12.74
* Upper Presidio to Johnson Ranch	4,136 Sq. Mi.	1954	.16	T	.11	1.08	.55	2.00	.50	2.14	.23	.20	0	T	6.97
		Total	28.80	22.84	16.35	35.64	65.59	90.88	155.88	156.96	119.45	69.29	28.53	36.10	826.31
		Average	.34	.27	.19	.42	.78	1.08	1.86	1.87	1.42	.82	.34	.43	9.82
Johnson Ranch to Langtry	12,924 Sq. Mi.	1954	.18	.01	.01	2.19	1.19	2.62	.38	1.68	.21	.37	.03	.01	8.88
		Total	42.37	27.06	37.40	68.73	127.71	150.02	163.71	190.00	185.35	98.39	51.54	49.24	1,191.52
		Average	.50	.32	.45	.82	1.52	1.79	1.95	2.26	2.21	1.17	.61	.59	14.19
Pecos River - Sheffield to Pecos River Station	3,504 Sq. Mi.	1954	.31	.16	.12	4.00	1.99	14.69	.30	.32	.40	1.79	.04	T	24.12
		Total	60.24	73.15	70.03	169.43	147.58	216.33	161.81	173.98	201.02	151.76	80.60	67.75	1,573.68
		Average	.72	.87	.83	2.02	1.76	2.58	1.93	2.07	2.39	1.81	.96	.81	18.75
* Langtry to Del Rio	2,911 Sq. Mi.	1954	.15	T	.03	3.87	1.39	8.31	.11	.49	.48	2.99	.01	T	17.83
		Total	44.48	51.93	71.82	114.90	167.00	193.23	102.02	140.40	190.58	111.75	68.12	57.01	1,313.24
		Average	.53	.62	.86	1.37	1.99	2.30	1.21	1.67	2.27	1.33	.81	.68	15.64
Devils River	4,185 Sq. Mi.	1954	.29	.28	.07	3.68	1.72	12.64	.40	.36	1.47	2.21	.20	T	23.32
		Total	56.76	52.81	97.95	153.01	217.12	232.69	149.23	178.54	246.61	178.88	139.31	91.31	1,794.22
		Average	.68	.63	1.17	1.82	2.58	2.77	1.78	2.13	2.93	2.13	1.66	1.09	21.37
* Del Rio to Eagle Pass	1,527 Sq. Mi.	1954	.67	.03	T	2.93	1.83	5.89	.67	1.25	3.29	2.61	.20	T	19.37
		Total	64.46	73.93	91.36	139.29	249.75	207.69	160.72	163.00	256.44	159.54	89.47	78.20	1,733.85
		Average	.77	.88	1.09	1.66	2.97	2.47	1.91	1.94	3.05	1.90	1.07	.93	20.64
* Eagle Pass to Laredo	4,037 Sq. Mi.	1954	.63	.08	.02	3.30	3.92	1.87	.37	.97	.32	1.52	.26	T	13.26
		Total	63.08	65.22	86.81	132.58	271.14	210.78	117.55	198.38	248.70	147.21	81.08	87.50	1,710.03
		Average	.75	.78	1.03	1.58	3.23	2.51	1.40	2.36	2.96	1.75	.97	1.04	20.36
* Laredo to Falcón Dam	3,178 Sq. Mi.	1954	.33	.03	.19	1.75	2.48	2.71	1.12	.97	1.20	2.28	.69	.05	13.80
		Total	62.20	62.10	73.87	121.38	285.67	154.39	194.20	153.59	239.56	127.67	139.44	69.90	1,683.97
		Average	.74	.74	.88	1.44	3.40	1.84	2.31	1.83	2.85	1.52	1.66	.83	20.04
* Falcón Dam to Rio Grande City	1,104 Sq. Mi.	1954	.29	.06	.27	3.50	2.44	3.41	.36	1.16	1.41	4.27	1.73	.01	18.91
		Total	73.47	64.64	89.22	99.16	206.09	170.96	173.26	177.52	267.54	159.27	60.08	55.52	1,596.73
		Average	.87	.77	1.06	1.18	2.45	2.04	2.06	2.11	3.18	1.90	.72	.66	19.00
United States Side Below Rio Grande City	458 Sq. Mi.	1954	.18	.07	.28	4.75	.92	3.69	.76	1.73	3.36	7.80	1.41	.07	25.02
		Total	101.46	84.81	95.52	111.97	242.45	206.43	150.93	194.58	359.67	206.29	117.12	107.95	1,979.18
		Average	1.21	1.01	1.14	1.33	2.89	2.46	1.80	2.32	4.28	2.46	1.39	1.29	23.58

* Excluding Río Conchos, Alamito, and Terlingua Creeks.

* Excluding Pecos and Devils Rivers and Arroyo las Vacas.

* Excluding San Felipe and Pinto Creeks, Río San Diego and Río San Rodrigo.

* Excluding Río Escondido.

* Excluding Río Salado.

* Excluding Río Alamo and Río San Juan.

LOCATION OF RAINFALL STATIONS ON THE RIO GRANDE WATERSHED

For detailed information regarding the particular months or years missing from the periods of record shown below, see "Index to Precipitation Records" in Water Bulletins Nos. 10, 14, and 22. These indexes also include the sources of data and the years and months included in the periods of record through 1952 for all stations on or adjacent to the watershed of the Rio Grande in the United States and Mexico.

In the United States

STA. NO.	STATION	LATITUDE	LONGITUDE	ELEVATION (FEET)	PERIOD OF RECORD	TYPE OF GAGE	WATERSHED SUBDIVISION	OBSERVER
59	Adams Bros. Ranch	30° 10'	101° 58'	2,150	Apr. 1952-1954	Standard	Johnson Ranch to Langtry	George Adams
1	American Dam	31° 47'	106° 32'	3,730	1938-1954	Standard	El Paso to Fort Quitman	IB&WC
81	Apache Ranch	27° 56'	99° 56'	500	# May 1953-1954	Cumulative	Eagle Pass to Laredo	Joe Starski
73	Armistead Ranch	29° 35'	100° 39'	1,510	Dec. 1951-1954	Standard	Del Rio to Eagle Pass	Floyd Hodges
90	Arroyo Tigre Chiquito	26° 41'	99° 07'	314	Apr. 1954	Cumulative	Laredo to Falcón Dam	IB&WC
63	Arthur, C. L. Ranch	30° 23'	103° 45'	4,900	# 1946-1954	Standard	Pecos River - Sheffield to Pecos River Station	C. L. Arthur
54	Arvins & Harkins - Bean	30° 26'	102° 23'	3,100	Nov. 1948-1954	Visual	Johnson Ranch to Langtry	Sid Harkins
55	Arvins & Harkins - Camel	30° 25'	102° 20'	2,890	Nov. 1948-1954	Visual	Johnson Ranch to Langtry	Sid Harkins
53	Arvins & Harkins - Header	30° 27'	102° 26'	3,400	Nov. 1948-1954	Visual	Johnson Ranch to Langtry	Sid Harkins
56	Arvins & Harkins - Headquarters	30° 27'	102° 19'	2,930	Nov. 1948-1954	Visual	Johnson Ranch to Langtry	Sid Harkins
57	Arvins & Harkins - Monty Corder	30° 27'	102° 14'	2,850	Nov. 1948-1954	Visual	Johnson Ranch to Langtry	Sid Harkins
25	Baugh, A. L. Ranch	29° 52'	104° 02'	3,820	# July 1942-1954	Standard	Alamito Creek	A. L. Baugh
44	Black Gap Game Refuge	29° 35'	103° 21'	2,250	1952-1954	Standard	Johnson Ranch to Langtry	F. O. Moore
16	Bloys Camp	30° 33'	104° 07'	5,650	# 1941-1954	Standard	Alamito Creek	J. H. McMichael
60	Bricker Ranch	29° 59'	101° 52'	1,680	May 1952-1954	Standard	Johnson Ranch to Langtry	Lena Mae Bricker
39	Buttrill Ranch	30° 00'	103° 16'	3,500	Mar. 1952-1954	Standard	Johnson Ranch to Langtry	Mrs. L. F. Buttrill
34	Castalon Ranger Station	29° 07'	103° 30'	2,100	# Mar. 1953-1954	Standard	Upper Presidio to Johnson Ranch	Park Ranger
102	CCWCID #3 (La Feria District Office) Avg. of 6 gages	26° 09'	97° 49'	50	1952-1954	Standard	Lower Rio Grande Valley	CCWCID #3
107	CCWID #11 (Bayview District Office) Avg. of 18 gages	26° 08'	97° 21'	25	1952-1954	Standard	Lower Rio Grande Valley	CCWID #11
104	CCWCID #19 (Adams Gardens)	26° 10'	97° 47'	50	1952-1954	Standard	Lower Rio Grande Valley	CCWCID #19
24	Chaffin, N. B. Ranch	29° 54'	104° 02'	3,800	# 1947-1954	Standard	Alamito Creek	N. B. Chaffin
50	Cinco de Mayo Ranch	29° 50'	101° 51'	1,680	# May 1952-1954	Standard	Johnson Ranch to Langtry	Louis Arledge
68	Comstock	29° 41'	101° 11'	1,530	May 1939-1954	Standard	Langtry to Del Rio	George Humphries
87	Corralitos Ranch	27° 07'	99° 27'	346	1953-1954	Cumulative	Laredo to Falcón Dam	IB&WC
4	County Line	31° 23'	105° 59'	3,550	1938-1954	Recording	El Paso to Fort Quitman	IB&WC
80	Cuervo Creek	28° 21'	100° 19'	620	1954	Cumulative	Eagle Pass to Laredo	IB&WC
97	Dale, O.C. Farm	26° 15'	98° 16'	130	1952-1954	Standard	Lower Rio Grande Valley	O. C. Dale
71	Devils Lake	29° 34'	100° 59'	1,080	May 1939-1954	Standard	Devils River	Central Power & Light Co.
72	Diablo Dam Site	29° 25'	101° 02'	980	Oct. 1954	Cumulative	Langtry to Del Rio	IB&WC
46	Dove Mountain Ranch	29° 49'	102° 53'	2,770	# Mar. 1952-1954	Standard	Johnson Ranch to Langtry	Roy McCracken
61	Dryden	30° 03'	102° 08'	2,160	# 1931-1954	Standard	Johnson Ranch to Langtry	IB&WC
99	Edinburg Filtration Plant	26° 18'	98° 10'	100	1952-1954	Standard	Lower Rio Grande Valley	City of Edinburg
78	El Indio	28° 31'	100° 19'	725	# June 1941-1954	Standard	Eagle Pass to Laredo	W. C. Smith
3	Fabens-Guadalupe Bridge	31° 26'	106° 08'	3,610	Apr. 1940-1954	Standard	El Paso to Fort Quitman	IB&WC
91	Falcón Dam	26° 34'	99° 08'	323	Apr. 1950-1954	Standard	Laredo to Falcón Dam	IB&WC
21	Fletcher, H. T. Ranch	30° 12'	104° 16'	5,100	# 1939-1954	Standard	Alamito Creek	H. T. Fletcher
5	Fort Hancock Bridge	31° 16'	105° 51'	3,500	Apr. 1940-1954	Standard	El Paso to Fort Quitman	IB&WC
85	Fort McIntosh, Laredo	27° 30'	99° 31'	410	# 1850-1954	Standard	Laredo to Falcón Dam	IB&WC
8	Fort Quitman	31° 06'	105° 36'	3,430	# 1937-1954	Recording	El Paso to Fort Quitman	IB&WC
48	Garner Ranch	29° 56'	102° 39'	2,600	1949-1954	Visual	Johnson Ranch to Langtry	Mrs. J. Garner
28	Greenwood, H. M. (Cienega Ranch)	29° 48'	104° 13'	4,000	Mar. 1941-1954	Standard	Alamito Creek	H. M. Greenwood
7	Guayuco Arroyo	31° 10'	105° 40'	3,600	# May 1940-1954	Recording	El Paso to Fort Quitman	IB&WC
55	Hardgrave, E. W. Ranch	30° 18'	102° 09'	2,650	Apr. 1952-1954	Standard	Johnson Ranch to Langtry	Jack Hardgrave
100	HCWID #6 (Elsa Office)	26° 19'	98° 01'	70	1952-1954	Standard	Lower Rio Grande Valley	HCWID #6
94	HCWCID #6 (Goodwin Pump #4) Avg. of 3 gages	26° 18'	98° 22'	185	1953-1954	Standard	Lower Rio Grande Valley	HCWCID #6
96	HCWCID #7 (Mission Office)	26° 17'	98° 18'	155	1952-1954	Standard	Lower Rio Grande Valley	HCWCID #7
98	HCWCID #15 (Edinburg Office)	26° 23'	98° 09'	85	1952-1954	Standard	Lower Rio Grande Valley	HCWCID #15
69	Hinds, Lucious Ranch	29° 46'	101° 03'	1,690	Sept. 1954	Standard	Devils River	Mr. Hinds
88	Hulsache Ranch	26° 57'	99° 20'	383	Aug. 1953-1954	Cumulative	Laredo to Falcón Dam	IB&WC
64	Ingram Ranch	29° 52'	101° 29'	1,580	Sept. 1954	Standard	Pecos River - Sheffield to Pecos River Station	Mr. Humphries
2	Island Station	31° 32'	106° 14'	3,630	1939-1954	Recording	El Paso to Fort Quitman	IB&WC
35	Johnson Ranch	29° 01'	103° 23'	2,050	# July 1933-1954	Standard	Upper Presidio to Johnson Ranch	IB&WC
82	Justapor Ranch	27° 53'	99° 27'	720	Oct. 1952-1954	Cumulative	Adjacent to Eagle Pass to Laredo	Mrs. M. A. Ray
12	Kelly Ranch	30° 32'	104° 16'	5,320	# 1941-1954	Visual	Adjacent to Alamito Creek	George Jones
67	King, Martin Ranch	29° 43'	101° 21'	1,260	Nov. 1954	Recording	Pecos River - Sheffield to Pecos River Station	IB&WC
41	Kokernot Ranch - Headquarters	29° 58'	103° 34'	4,120	1952-1954	Standard	Johnson Ranch to Langtry	David Kokernot
42	Kokernot Ranch - No. 2	29° 59'	103° 35'	4,170	1949-1954	Visual	Johnson Ranch to Langtry	David Kokernot
103	La Feria Pump	26° 03'	97° 50'	60	1952-1954	Standard	Lower Rio Grande Valley	CCWCID #3
19	Lane, Joe Ranch	30° 08'	103° 47'	4,960	1953-1954	Recording	Alamito Creek	Joe Lane
84	Laredo Water Plant	27° 33'	99° 31'	410	# 1930-1954	Standard	Eagle Pass to Laredo	Laredo Water Plant
86	Laredo International Bridge	27° 30'	99° 29'	400	# 1941-1954	Standard	Laredo to Falcón Dam	U.S. Weather Bureau
14	Livingston Ranch	29° 49'	104° 22'	4,150	# 1951-1954	Standard	Upper Presidio to Johnson Ranch	J. S. Livingston
20	Loma Vista Ranch	30° 13'	103° 47'	5,450	# 1941-1954	Standard	Alamito Creek	Hays Mitchell
108	Los Fresnos Pump	25° 57'	97° 34'	30	1952-1954	Standard	Lower Rio Grande Valley	CCWCID #6
6	Madden Arroyo	31° 13'	105° 46'	3,500	Sept. 1941-1954	Recording	El Paso to Fort Quitman	IB&WC
47	Maravillas	29° 34'	102° 47'	1,810	Oct. 1949-1954	Standard	Johnson Ranch to Langtry	IB&WC
17	Marfa Experiment Station	30° 20'	103° 59'	4,800	1950-1954	Standard	Alamito Creek	P. H. Vardiman
30	Mariposa Mine	29° 20'	103° 43'	3,500	# 1951-1954	Standard	Upper Presidio to Johnson Ranch	Frank Duncan
74	Maverick County Canal Headgate	29° 10'	100° 46'	870	Mar. 1948-1954	Standard	Del Rio to Eagle Pass	Gate Tender
76	Maverick Power Plant	28° 50'	100° 33'	800	June 1952-1954	Standard	Del Rio to Eagle Pass	Central Power & Light Co.
27	McCracken Ranch	29° 51'	104° 14'	4,250	# 1941-1954	Standard	Alamito Creek	J. M. Humphreys
23	McFarland Ranch	30° 06'	104° 16'	5,310	# 1941-1954	Standard	Alamito Creek	M. E. Bomar
52	McGonagill Ranch - East Windmill	30° 20'	102° 55'	4,050	May 1952-1954	Visual	Johnson Ranch to Langtry	W. E. McGonagill
51	McGonagill Ranch - Headquarters	30° 20'	102° 58'	4,150	Apr. 1952-1954	Standard	Johnson Ranch to Langtry	W. E. McGonagill
95	Mission Pump	26° 10'	98° 20'	100	1952-1954	Standard	Lower Rio Grande Valley	HCWCID #14
18	Mitchell, Kerr Ranch	30° 13'	104° 00'	4,450	# 1941-1954	Standard	Alamito Creek	Mrs. Kerr Mitchell
101	Murse Farm	26° 19'	97° 55'	65	1952-1954	Standard	Lower Rio Grande Valley	Mr. Murse
9	Neely Ranch	30° 59'	105° 32'	3,350	Aug. 1941-1954	Standard	Fort Quitman to Upper Presidio	Mrs. Tom Neely
32	02 Ranch	29° 51'	103° 45'	3,780	# 1914-1954	Standard	Terlingua Creek	Cavin Woodward
36	Panther Junction	29° 19'	103° 13'	4,100	June 1953-1954	Standard	Johnson Ranch to Langtry	Park Ranger
66	Pecos River	29° 45'	101° 21'	1,060	# Mar. 1938-1954	Standard	Pecos River - Sheffield to Pecos River Station	IB&WC
45	Persimmon Gap Ranger Station	29° 40'	103° 10'	2,900	# Mar. 1948-1954	Standard	Johnson Ranch to Langtry	Park Ranger
13	Petan Ranch	30° 04'	104° 29'	5,400	1950-1954	Standard	Adjacent to Fort Quitman to Upper Presidio	Mr. Harrington
43	Potter, A. M. Ranch	29° 46'	103° 25'	3,440	1952-1954	Standard	Johnson Ranch to Langtry	A. M. Potter
15	Presidio (IB&WC Gage)	29° 34'	104° 23'	2,550	Oct. 1949-1954	Standard	Upper Presidio to Johnson Ranch	IB&WC
62	Pumpville	29° 57'	101° 44'	1,800	# Oct. 1946-1954	Standard	Johnson Ranch to Langtry	C. Cash
11	Quebec Ranch	30° 31'	104° 24'	4,600	1949-1954	Visual	Adjacent to Upper Presidio to Johnson Ranch	George Jones
75	Quemado	28° 56'	100° 37'	765	# Nov. 1941-1954	Standard	Del Rio to Eagle Pass	Walter P. Cox
29	Redford	29° 29'	104° 13'	2,500	July 1954	Cumulative	Lower Presidio to Johnson Ranch	IB&WC
93	Rio Grande City Gaging Station	26° 20'	98° 47'	150	July 1939-1954	Standard	Falcón Dam to Rio Grande City	IB&WC
92	Roma	26° 24'	99° 01'	230	1941-1954	Standard	Falcón Dam to Rio Grande City	IB&WC
10	Roosevelt, Al Ranch	30° 32'	104° 33'	4,330	1951-1954	Visual	Adjacent to Fort Quitman to Upper Presidio	Al Roosevelt
105	San Benito Pump	26° 03'	97° 45'	50	Oct. 1933-1954	Standard	Lower Rio Grande Valley	IB&WC

Some months or years missing

LOCATION OF RAINFALL STATIONS ON THE RIO GRANDE WATERSHED

In the United States

STA. NO.	STATION	LATITUDE	LONGITUDE	ELEVATION (FEET)	PERIOD OF RECORD	TYPE OF GAGE	WATERSHED SUBDIVISION	OBSERVER
26	San Jacinto Ranch	29° 44'	103° 59'	3,560	1953-1954	Visual	Alamito Creek	N. B. Chaffin
83	Santa Ysabel Farm	27° 39'	99° 37'	440	Nov. 1952-1954	Standard	Eagle Pass to Laredo	Robert Cunningham
40	Santiago Peak Ranch	29° 55'	103° 23'	3,730	1953-1954	Standard	Johnson Ranch to Langtry	Ellis Owens
22	Sauz Ranch	30° 10'	104° 12'	4,880	# 1940-1954	Standard	Alamito Creek	H. T. Fletcher, Jr.
65	Shumla Bend	29° 50'	101° 25'	1,350	Nov. 1954	Cumulative	Pecos River - Sheffield to Pecos River Station	IB&WC
49	Stumberg, Steve Ranch	30° 11'	102° 53'	4,300	# 1943-1954	Recording	Johnson Ranch to Langtry	IB&WC
33	Terlingua Creek Station	29° 12'	103° 36'	2,260	Mar. 1952-1954	Recording	Terlingua Creek	IB&WC
77	Tortuga Ranch	28° 39'	100° 26'	780	# May 1950-1954	Standard	Eagle Pass to Laredo	W. H. Brown
70	Upper Devils	29° 45'	101° 01'	1,260	Sept. 1954	Cumulative	Devils River	IB&WC
31	Van Eman Ranch	30° 52'	103° 59'	3,890	# 1947-1954	Standard	Alamito Creek	L. T. Van Eman
106	Whipple Farm	26° 04'	97° 29'	25	1952-1954	Standard	Lower Rio Grande Valley	Harry Whipple
37	Willoughby, Ray Ranch	30° 12'	103° 33'	5,050	1952-1954	Standard	Johnson Ranch to Langtry	Cliff St. Clair
38	Woodward, J. F. Ranch	30° 08'	103° 36'	4,750	1954	Visual	Johnson Ranch to Langtry	J. F. Woodward
79	Wuensche Farm	28° 24'	100° 19'	640	# 1952-1954	Standard	Eagle Pass to Laredo	W. H. Brown
89	Zapata Station	26° 52'	99° 17'	300	May 1953-1954	Cumulative	Laredo to Falcón Dam	IB&WC

In Mexico

132	Allende, Coah.	28° 21'	100° 51'	1,170	# 1947-1954	Standard	Río Escondido	Hydraulic Resources
145	Anáhuac, N.L.	27° 15'	100° 07'	650	June 1933-1954	Standard	Río Salado	Hydraulic Resources
173	Anzaldúas, Tamps.	26° 09'	98° 23'	110	# Dec. 1952-1954	Standard	Lower Rio Grande Valley	Hydraulic Resources
111	Belleza, Chih.	26° 57'	106° 21'	5,870	# 1903-1954	Standard	Río Conchos	Meteor. Service of Mexico
157	Cadereyta, N.L.	25° 36'	99° 59'	1,180	# Sept. 1904-1954	Standard	Río San Juan	Hydraulic Resources
174	Camargo, Tamps.	26° 20'	98° 49'	175	# 1953-1954	Standard	Río San Juan	Hydraulic Resources
136	Castaños, Coah.	26° 47'	101° 27'	2,440	# Oct. 1932-1954	Standard	Río Salado	Hydraulic Resources
171	Cerralvo, N.L.	26° 06'	99° 37'	1,130	# Nov. 1938-1954	Recording	Río San Juan	Hydraulic Resources
122	Chihuahua, Chih.	28° 38'	106° 04'	4,690	# 1900-1954	Standard	Río Conchos	Meteor. Service of Mexico
166	Ciénaga de Flores, N.L.	25° 58'	100° 10'	1,760	Apr. 1938-1954	Recording	Río San Juan	Hydraulic Resources
128	Cd. Acuña, Coah.	29° 20'	100° 53'	919	1951-1954	Standard	Langtry to Del Rio	Mexican Section IB&WC
148	Cd. Miguel Alemán, Tamps.	26° 24'	99° 02'	180	1951-1954	Standard	Falcón to Río Grande City	Mexican Section IB&WC
172	Comales, Tamps.	26° 14'	98° 58'	270	# Mar. 1938-1954	Recording	Río San Juan	Hydraulic Resources
179	Control (C1-K-9), Tamps.	25° 58'	97° 49'	59	# June 1942-1954	Standard	Lower Rio Grande Valley	Hydraulic Resources
135	Cuatro Ciénegas, Coah.	27° 00'	102° 05'	2,430	# June 1923-1954	Standard	Río Salado	Hydraulic Resources
120	Cuauhtémoc, Chih.	28° 24'	106° 52'	7,250	# June 1923-1954	Standard	Adjacent to Río Conchos	Hydraulic Resources
125	Cuchillo Parado, Chih.	29° 26'	104° 53'	2,982	1951-1954	Standard	Río Conchos	Mexican Section IB&WC
121	Cusihuiriachic, Chih.	28° 16'	106° 51'	6,510	# Oct. 1941-1954	Standard	Río Conchos	Hydraulic Resources
117	Delicias, Chih.	28° 11'	105° 31'	3,710	# Aug. 1933-1954	Standard	Río Conchos	Hydraulic Resources
143	Don Martín, Coah.	27° 30'	100° 36'	790	# June 1927-1954	Standard	Río Salado	Hydraulic Resources
159	El Cuchillo, N.L.	25° 43'	99° 16'	590	June 1938-1954	Standard	Río San Juan	Hydraulic Resources
160	Gral. Bravo, N.L.	25° 48'	99° 09'	390	# Sept. 1906-1954	Standard	Río San Juan	Meteor. Service of Mexico
161	Gral. Cepeda, Coah.	25° 24'	101° 29'	4,920	Aug. 1926-1954	Standard	Río San Juan	Hydraulic Resources
118	Guerrero, Chih.	28° 33'	107° 30'	6,560	# May 1903-1954	Standard	Adjacent to Río Conchos	Meteor. Service of Mexico
147	Guerrero, Tamps.	26° 47'	99° 20'	295	# 1936-1954	Standard	Río Salado	Mexican Section IB&WC
168	Higueras, N.L.	25° 59'	100° 01'	1,640	# Sept. 1906-1954	Standard	Río San Juan	Meteor. Service of Mexico
130	Jiménez, Coah.	29° 04'	100° 40'	814	# 1951-1954	Standard	Del Rio to Eagle Pass	Mexican Section IB&WC
146	Joya, Coah.	26° 28'	101° 13'	3,680	# Aug. 1927-1936	Standard	Río Salado	Hydraulic Resources
112	La Boquilla, Chih.	27° 32'	105° 25'	4,320	# 1919-1954	Standard	Río Conchos	Río Conchos Hydroelectric Co.
119	La Junta, Chih.	28° 26'	107° 20'	6,730	# 1925-1954	Standard	Adjacent to Río Conchos	Hydraulic Resources
144	Laguna de Sallnillas, N.L.	27° 26'	100° 22'	750	# 1940-1954	Standard	Río Salado	Hydraulic Resources
151	Laguna de Sánchez, N.L.	25° 21'	100° 16'	6,500	Apr. 1941-1954	Recording	Río San Juan	Hydraulic Resources
123	Las Burras, Chih.	28° 27'	105° 26'	3,586	July 1949-1954	Standard	Río Conchos	Hydraulic Resources
155	Las Comitas, N.L.	25° 26'	99° 07'	1,670	1940-1954	Standard	Río San Juan	Hydraulic Resources
158	Las Enramadas, N.L.	25° 48'	99° 16'	730	# Sept. 1926-1954	Standard	Río San Juan	Hydraulic Resources
116	Las Vírgenes, Chih.	28° 10'	105° 38'	4,068	# 1943-1954	Standard	Río Conchos	Hydraulic Resources
183	Linares, N.L.	24° 52'	99° 34'	1,180	# 1900-1954	Recording	Adjacent to Río San Juan	Hydraulic Resources
170	Los Herreras, N.L.	25° 55'	99° 24'	820	Sept. 1939-1954	Recording	Río San Juan	Hydraulic Resources
169	Los Ramones, N.L.	25° 42'	99° 13'	270	# Sept. 1939-1954	Recording	Río San Juan	Hydraulic Resources
124	Maclovio Herrera, Chih.	29° 03'	105° 08'	3,380	# 1924-1954	Standard	Río Conchos	Meteor. Service of Mexico
180	Matamoros, Tamps.	25° 52'	97° 30'	40	# Apr. 1912-1954	Standard	Lower Rio Grande Valley	Meteor. Service of Mexico
182	Méndez, Tamps.	25° 07'	98° 35'	420	# Sept. 1939-1954	Standard	Adjacent to Lower Rio Grande Valley	Hydraulic Resources
137	Monclova, Coah.	26° 54'	101° 25'	1,940	# 1897-1954	Standard	Río Salado	Meteor. Service of Mexico
150	Montemorelos, N.L.	25° 12'	99° 50'	1,420	# Aug. 1904-1954	Standard	Río San Juan	Hydraulic Resources
154	Monterrey, N.L.	25° 40'	100° 18'	1,730	# 1896-1954	Standard	Río San Juan	Hydraulic Resources
140	Nueva Rosita, Coah.	27° 55'	101° 17'	1,410	# Aug. 1925-1954	Standard	Río Salado	Meteor. Service of Mexico
134	Nuevo Laredo, Tamps.	27° 29'	99° 31'	420	# 1909-1954	Standard	Laredo to Falcón	Meteor. Service of Mexico
127	Ojinaga, Chih.	29° 34'	104° 24'	2,585	Apr. 1954	Standard	Río Conchos	Mexican Section IB&WC
126	Ojinaga, Chih.	29° 34'	104° 25'	2,620	# Nov. 1906-1954	Standard	Río Conchos	Meteor. Service of Mexico
113	Ojo Caliente, Chih.	27° 37'	105° 16'	4,010	1942-1954	Standard	Río Conchos	Hydraulic Resources
129	Palestina, Coah.	29° 08'	100° 57'	1,080	# 1931-1954	Standard	Del Rio to Eagle Pass	Hydraulic Resources
110	Parral, Chih.	26° 56'	105° 39'	5,740	# 1903-1954	Standard	Río Conchos	Meteor. Service of Mexico
131	Piedras Negras, Coah.	28° 42'	100° 31'	715	# 1951-1954	Standard	Del Rio to Eagle Pass	Mexican Section IB&WC
139	Progreso, Coah.	27° 28'	101° 03'	1,200	Feb. 1943-1954	Standard	Río Salado	Hydraulic Resources
164	Ramos Arizpe, Coah.	25° 32'	100° 58'	4,590	# Apr. 1907-1954	Standard	Río San Juan	Meteor. Service of Mexico
149	Rayones, N.L.	25° 01'	100° 05'	1,970	# Oct. 1926-1954	Standard	Río San Juan	Hydraulic Resources
162	Reata, Coah.	26° 07'	101° 04'	3,070	# July 1944-1948	Standard	Río San Juan	Hydraulic Resources
178	Retamal, Tamps.	26° 02'	98° 02'	82	Oct. 1949-1954	Standard	Lower Rio Grande Valley	Mexican Section IB&WC
177	Reynosa, Tamps.	26° 06'	98° 17'	130	# 1941-1954	Recording	Lower Rio Grande Valley	Hydraulic Resources
165	Rinconada, N.L.	25° 40'	100° 40'	4,790	Apr. 1944-1954	Standard	Río San Juan	Hydraulic Resources
176	Río Bravo, Tamps.	26° 00'	98° 06'	85	# Sept. 1950-1954	Standard	Lower Rio Grande Valley	Hydraulic Resources
114	Rosetilla, Chih.	28° 14'	105° 19'	3,780	1940-1954	Standard	Río Conchos	Río Conchos Hydroelectric Co.
141	Sabinas, Coah.	27° 54'	101° 17'	1,430	# May 1922-1954	Standard	Río Salado	Hydraulic Resources
163	Saltillo, Coah.	25° 26'	101° 00'	5,280	# 1886-1954	Standard	Río San Juan	Hydraulic Resources
109	San Antonio, Dgo.	26° 25'	105° 21'	5,430	1943-1954	Standard	Río Conchos	Hydraulic Resources
138	San Buenaventura, Coah.	27° 05'	101° 33'	2,300	# Dec. 1926-1954	Standard	Río Salado	Meteor. Service of Mexico
175	San Miguel de Camargo, Tamps.	26° 14'	98° 36'	130	# 1953-1954	Standard	Lower Rio Grande Valley	Hydraulic Resources
153	Santa Catarina, N.L.	25° 41'	100° 26'	1,970	Oct. 1937-1954	Recording	Río San Juan	Hydraulic Resources
167	Topo Chico, N.L.	25° 49'	100° 20'	1,640	# Aug. 1939-1954	Recording	Río San Juan	Hydraulic Resources
181	Valle Hermoso, Tamps.	25° 41'	97° 48'	56	# June 1949-1954	Standard	Lower Rio Grande Valley	Hydraulic Resources
152	Villa Allende, N.L.	25° 17'	100° 01'	2,210	# Nov. 1938-1954	Standard	Río San Juan	Hydraulic Resources
156	Villa de Santiago, N.L.	25° 25'	100° 07'	1,460	# 1923-1954	Standard	Río San Juan	Hydraulic Resources
133	Villa Hidalgo, Coah.	27° 47'	99° 52'	499	1951-1954	Standard	Eagle Pass to Laredo	Mexican Section IB&WC
142	Villa Juárez, Coah.	27° 36'	100° 46'	900	# 1943-1954	Standard	Río Salado	Hydraulic Resources
184	Villagrán, Tamps.	24° 29'	99° 29'	1,260	# Sept. 1939-1954	Recording	Adjacent to Río San Juan	Hydraulic Resources
115	Villalba, Chih.	28° 01'	105° 46'	3,940	Oct. 1940-1954	Standard	Río Conchos	Hydraulic Resources

* Some months or years missing

EVAPORATION IN THE RIO GRANDE BASIN IN INCHES

In the United States

Tabulated below are records of evaporation observed at eight stations from Presidio, Texas to Falcón Dam near Roma, Texas. All of these stations are operated and maintained by the United States Section of this Commission, except two. The one at Del Rio, Texas is operated by the U.S. Weather Bureau and the one at Tortuga Ranch near Eagle Pass, Texas is operated by the Maverick Irrigation District. At all stations, the exposure to wind is uniform and relatively unimpeded. The sites are kept cleared of all high brush and trees within 150 feet and of all brush and tall weeds within 100 feet of the fenced enclosures. Within the enclosures, all vegetation either has been eradicated or is kept trimmed to within 3 inches of the ground surface. No water barrels, tanks or objects of similar size are stored within 100 feet of the enclosures.

Three types of pans are in use at these stations:

1. U. S. Weather Bureau Standard pan. A circular pan, 4 feet in diameter and 10 inches deep, made of 22-gage galvanized iron, is set on a wooden platform with the rim of the pan 16 inches above the ground. The water level is maintained between 2 and 3 inches below the rim of the pan. This type of pan is in operation at Dryden, Del Rio, and Fort McIntosh (Laredo), Texas.

2. A circular pan, 2 feet in diameter and 36 inches deep, made of 22-gage galvanized iron, is set in the ground with the rim of the pan 3 inches above the ground surface and the top covered with a circular screen of No. 4 (1/4" mesh) galvanized hardware cloth. The water level is maintained between 2.5 and 3.5 inches below the rim of the pan. This type of pan is in operation at Presidio, Johnson Ranch, Maravillas Creek, Dryden, Tortuga Ranch near Eagle Pass, Fort McIntosh (Laredo), and Falcón Dam, Texas.

3. A circular pan, 12 feet in diameter and 36 inches deep, made of 20-gage galvanized iron, is set in the ground with the rim of the pan 3 inches above the ground surface. The water level is maintained between 2.5 and 3.5 inches below the rim of the pan. This type of pan is in operation at Dryden and Fort McIntosh (Laredo), Texas.

Month	Presidio, Texas		Johnson Ranch, Texas		Maravillas, Texas		Dryden, Texas					
							2-Foot Pan		4-Foot Pan		12-Foot Pan	
	1954	Average Nov. 1949 to 1954	1954	Average Oct. 1949 to 1954	1954	Average Nov. 1949 to 1954	1954	Average Sept. 1949 to 1954	1954	Average Oct. 1944 to 1954	1954	Average Oct. 1949 to 1954
Jan.	4.43	4.27	4.52	4.66	4.51	4.68	3.21	4.11	3.97	4.62	2.97	3.90
Feb.	5.75	5.33	6.34	6.02	6.22	5.23	5.56	5.04	8.21	6.28	5.74	4.91
Mar.	9.70	9.05	9.58	9.16	7.96	7.52	8.43	7.73	11.94	10.39	8.32	7.32
Apr.	9.62	10.88	10.20	11.33	7.11	10.05	6.56	8.87	9.94	12.72	6.89	9.37
May	14.54	13.70	14.90	14.11	10.24	10.51	9.88	10.75	14.57	14.86	9.20	10.96
June	13.76	14.46	14.16	15.25	12.36	12.25	11.78	11.92	15.85	16.19	11.60	12.37
July	14.62	13.67	16.25	15.20	14.49	12.67	13.69	13.71	17.99	17.06	13.19	13.20
Aug.	12.59	14.22	12.88	14.65	11.15	11.56	12.18	12.54	15.53	15.71	11.52	12.20
Sept.	12.59	12.31	12.89	12.22	9.83	9.85	11.27	9.32	13.68	12.12	10.05	9.28
Oct.	9.76	9.36	10.57	9.54	7.46	7.79	6.96	6.89	8.01	8.00	6.33	6.52
Nov.	5.78	5.65	6.08	5.91	5.41	5.62	5.90	5.34	7.22	6.00	5.25	4.84
Dec.	4.93	4.06	5.15	4.74	5.94	4.64	6.54	4.56	6.57	4.81	4.74	3.78
Total	118.07	116.96	123.52	122.79	102.68	102.37	101.96	100.78	133.48	128.76	95.80	98.65

Month	Del Rio, Texas		Tortuga Ranch, Texas		Fort McIntosh, Texas						Falcón Dam, Texas	
					2-Foot Pan		4-Foot Pan		12-Foot Pan			
	1954	Average June 1952 to 1954	1954	Average # 1952 to 1954	1954	Average Feb. 1950 to 1954	1954	Average Feb. 1950 to 1954	1954	Average Feb. 1950 to 1954	1954	Average Apr. 1950 to 1954
Jan.	3.67	4.94	2.96	3.80	2.85	4.17	3.66	5.24	2.42	3.56	2.42	4.38
Feb.	7.47	6.90	5.02	5.33	5.75	4.86	7.42	6.34	5.38	4.39	5.94	6.11
Mar.	9.32	9.00	5.97	5.93	7.33	7.06	9.19	9.04	6.52	6.48	6.77	8.05
Apr.	8.61	10.50	5.82	7.86	8.36	8.83	9.74	10.99	7.05	7.61	7.67	8.97
May	12.03	13.88	9.25	10.19	10.35	10.04	12.32	13.34	9.56	9.37	9.75	11.15
June	12.26	14.95		13.18	11.73	12.13	14.18	14.56	11.15	10.81	11.12	12.61
July	14.82	16.76		14.77	10.56	13.70	13.44	16.12	9.49	12.01	12.15	13.91
Aug.	14.19	15.10			12.38	12.70	15.31	15.12	11.04	10.93	11.63	12.32
Sept.	12.67	11.48			9.15	9.35	11.17	11.40	8.30	8.66	9.48	9.32
Oct.	7.50	8.18		7.22	6.38	7.24	7.75	7.99	5.63	6.16	6.38	7.26
Nov.	6.04	5.32		4.41	4.26	4.72	5.23	5.28	3.91	4.16	4.41	5.45
Dec.	5.22	4.27		3.27	4.27	3.95	4.85	4.47	3.76	3.33	4.72	4.59
Total	113.80	121.28			93.37	98.75	114.26	119.89	84.21	87.47	92.44	104.12

Some months missing

EVAPORATION IN THE RIO GRANDE BASIN
IN INCHES

In Mexico

Tabulated below are records of evaporation observed at ten stations which are operated and maintained by the Mexican Section of this Commission. Eight stations are located along the Rio Grande from Cd. Acuña, Coahuila to Matamoros, Tamaulipas and two are located on the Río Conchos at Cuchillo Parado, Chihuahua and Ojinaga, Chihuahua. At all stations, the sites are kept cleared of all high brush and trees within 150 feet and of all brush and tall weeds within 100 feet of the fenced enclosures. Inside the enclosures, all vegetation either has been eradicated or is kept trimmed to within 3 inches of the ground surface. Except for a water barrel and a thermometer shelter in the northeast and northwest corners of the enclosures, the exposure to wind is uniform and relatively unimpeded.

The type of pan used at all these stations is a U.S. Weather Bureau Standard Pan, 4 feet in diameter and 10 inches deep, made of 22-gage galvanized iron, and set on a wooden platform with the rim of the pan 16 inches above the ground. The water level is maintained between 2 and 3 inches below the rim of the pan and is measured with a micrometer gage.

Data for other evaporation stations in the Rio Grande Basin in Mexico, which are operated by various Mexican agencies, are available in Water Bulletin No. 24, published by the Mexican Section of this Commission.

Month	Cuchillo Parado, Chih.		Ojinaga, Chih.		Cd. Acuña, Coah.		Jiménez, Coah.		Piedras Negras, Coah.	
	1954	Average 1951-1954	1954	Average	1954	Average 1951-1954	1954	Average #1951-1954	1954	Average #1951-1954
Jan.	5.31	5.00			2.96	4.46	2.65	4.59	2.54	3.67
Feb.	6.52	6.40			6.67	5.91	4.87	5.22	5.19	5.38
Mar.	11.69	10.81			8.59	8.67	7.01	7.53	7.48	7.08
Apr.	12.68	13.44	9.14		7.24	10.03	6.50	8.59	6.78	9.12
May	17.37	16.63	11.89		10.19	11.28	9.37	10.01	9.42	11.14
June	17.00	17.46	12.91		10.44	12.68		11.96		11.77
July	15.87	15.62	11.68		12.13	14.45		13.89		15.11
Aug.	12.86	14.78	9.44		11.80	13.43	10.79	12.23	10.83	13.00
Sept.	11.85	12.62	8.53		10.14	9.71	8.77	8.34	7.30	8.65
Oct.	8.83	9.41	6.40		5.69	6.50	5.58	5.85	5.98	6.18
Nov.	5.74	5.59	4.19		5.02	4.35	4.12	3.70	4.16	3.71
Dec.	4.59	4.20	3.32		4.81	3.82	4.11	3.29	4.04	3.38
Total	130.31	131.96			95.68	105.29		95.20		98.19

Month	Hidalgo, Coah.		Cd. Guerrero, Tamps.		Cd. Miguel Alemán, Tamps.		Retamal, Tamps.		Matamoros, Tamps.	
	1954	Average 1951-1954	1954	Average #1951-1954	1954	Average 1951-1954	1954	Average 1951-1954	1954	Average #1951-1954
Jan.	4.28	5.18	3.67	5.31	3.85	5.72	4.11	5.14	3.30	4.12
Feb.	6.65	6.27	4.71	5.98	6.44	7.27	5.99	5.78	4.60	4.50
Mar.	10.15	9.15		8.80	9.14	9.12	7.50	7.64	5.78	5.16
Apr.	10.82	11.56		11.69	10.24	10.84	8.69	9.00		6.23
May	13.65	13.92		13.27	10.11	11.95	8.93	10.06		7.89
June	14.41	14.87	Dis-	15.53	10.76	13.45	9.65	10.34	Dis-	8.59
July	15.48	17.20	continued	16.79	12.48	15.22	9.84	10.46	continued	9.91
Aug.	15.48	16.76		16.04	13.88	15.15	9.95	10.14		10.85
Sept.	11.79	11.94		10.91	10.07	9.41	7.17	7.82		8.72
Oct.	8.69	8.32		7.94	7.00	7.26	5.48	6.18		6.96
Nov.	5.96	5.85		5.07	4.98	4.88	3.99	3.97		3.90
Dec.	6.15	5.14		4.39	4.65	4.38	4.72	4.12		3.07
Total	123.51	126.16		121.72	103.60	114.65	86.02	90.65		79.90

Some months missing

TEMPERATURE, HUMIDITY, AND WIND

The mean monthly temperatures shown for Johnson Ranch in the United States and all stations in Mexico are averages of daily maximum and minimum thermometer observations.

The mean monthly temperatures and relative humidities at the Dryden, Fort McIntosh, and Falcón Dam evaporation stations were integrated from continuous records of hygrothermographs, housed in louvered shelters, with the sensing elements of the instruments 16 inches above the ground and 9 feet southwest of either a 2 or 4-foot diameter evaporation pan.

Monthly mean wind velocities are based on the total miles of wind movement indicated by a standard 3-cup anemometer installed and operated according to specifications for a Class A Weather Bureau evaporation station.

Mean Temperature – Degrees Fahrenheit

In the United States

Month	Johnson Ranch, Texas		Dryden, Texas		Fort McIntosh, Texas		Falcón Dam, Texas	
	1954	Average Aug. 1945-1954	1954	Average July 1947-1954	1954	Average Feb. 1950-1954	1954	Average July 1950-1954
Jan.	58.0	53.9	50.3	48.7	60.6	60.6	59.9	62.1
Feb.	64.5	59.8	57.8	54.1	67.5	63.5	67.1	64.4
Mar.	67.5	67.6	60.9	60.6	69.7	69.8	70.3	71.3
Apr.	78.3	76.1	70.2	68.8	78.3	76.6	78.4	77.2
May	82.2	83.5	74.3	76.3	80.6	81.3	80.6	81.2
June	90.2	89.9	82.3	82.9	86.3	86.2	86.1	86.7
July	90.9	89.6	85.6	84.4	87.0	88.3	87.6	88.0
Aug.	89.2	89.3	85.0	83.6	87.3	88.4	87.9	87.8
Sept.	87.1	83.8	81.8	78.0	85.6	84.1	84.7	83.8
Oct.	80.3	75.4	69.8	69.0	75.3	75.7	76.0	75.8
Nov.	62.2	62.0	58.4	55.9	63.4	63.9	65.9	65.2
Dec.	56.0	55.0	52.9	49.7	67.3	58.9	63.4	59.6
Yearly	75.5	73.8	69.1	67.7	75.7	74.8	75.7	75.3

In Mexico

Month	Cuchillo Parado, Chih.		Cd. Acuña, Coah.		Jiménez, Coah.		Piedras Negras, Coah.	
	1954	Average 1951-1954	1954	Average Apr. 1951-1954	1954	Average #Mar. 1951-1954	1954	Average #Apr. 1951-1954
Jan.	52.7	53.0	52.9	55.9	54.5	57.3	50.9	54.9
Feb.	56.5	54.4	61.5	59.3	62.2	60.0	60.1	58.1
Mar.	60.8	61.0	64.4	65.4	64.2	65.2	59.7	62.8
Apr.	71.4	69.0	75.2	73.3	73.8	72.2	71.6	71.6
May	78.1	76.6	78.6	79.5	76.8	77.8	75.2	77.2
June	85.6	86.3	85.5	87.4		85.9		86.0
July	82.0	84.4	88.5	89.7		88.3		88.9
Aug.	82.8	85.1	88.9	90.2		88.0		87.6
Sept.	80.2	79.2	86.4	83.8		80.7		79.3
Oct.	71.2	70.0	73.8	72.9	77.0	73.0		69.5
Nov.	59.0	56.8	59.7	59.6	62.4	60.6	57.7	57.6
Dec.	50.5	49.6	54.0	52.4	56.3	53.6	53.2	51.5
Yearly	69.2	68.8	72.4	72.4		71.9		70.4

Month	Villa Hidalgo, Coah.		Cd. Guerrero, Tamps.		Cd. Miguel Alemán, Tamps.		Retamal, Tamps.		Matamoros, Tamps.	
	1954	Average Aug. 1951-1954	1954	Average # 1951-1954	1954	Average 1951-1954	1954	Average 1951-1954	1954	Average #Apr. 1951-1954
Jan.	56.7	59.7	62.2	62.4	60.8	61.6	64.6	64.6		65.4
Feb.	62.1	60.2	67.5	64.4	67.6	64.1	67.6	65.1		65.4
Mar.	67.3	68.0		70.8	69.4	72.3	69.4	72.4	68.9	72.0
Apr.	75.4	75.6		76.3	79.2	78.0	79.9	77.8		75.2
May	76.1	78.3		80.9	80.2	81.8	79.9	81.2		79.9
June	85.1	86.4		85.6	85.6	87.4	84.9	86.1		82.8
July	86.4	87.7		86.3	87.4	88.6	85.5	87.1		85.0
Aug.	86.7	87.8		86.1	89.6	88.8	86.7	87.5		85.2
Sept.	84.0	82.9		82.6	86.2	84.6	83.7	83.3		81.6
Oct.	75.7	74.3		75.6	77.4	75.8	76.6	75.9		76.4
Nov.	62.4	61.7		64.6	65.8	65.4	66.2	66.6		68.3
Dec.	57.9	56.4		61.1	62.1	59.9	66.4	62.4		60.7
Yearly	73.0	73.2		74.7	75.9	75.7	76.0	75.8		74.8

Mean Relative Humidity – Percent

In the United States

Month	Dryden, Texas		Fort McIntosh, Texas		Falcón Dam, Texas	
	1954	Average July 1947-1954	1954	Average Feb. 1950-1954	1954	Average July 1950-1954
Jan.	64.8	52.8	63.7	51.6	72.3	58.8
Feb.	37.3	47.4	40.8	50.8	50.3	54.4
Mar.	32.3	40.6	46.2	49.3	54.5	57.6
Apr.	67.1	47.0	60.8	51.9	65.7	58.1
May	59.6	51.7	56.0	54.5	62.0	61.6
June	63.1	52.7	58.1	55.5	65.2	62.9
July	49.2	48.5	53.2	51.1	58.9	57.6
Aug.	54.3	49.6	55.8	53.1	61.0	59.7
Sept.	49.0	51.2	55.7	53.9	64.6	61.3
Oct.	60.7	55.2	59.9	55.3	68.3	62.9
Nov.	45.3	48.9	54.4	55.9	62.1	61.2
Dec.	38.7	50.4	52.3	54.5	54.8	57.2
Yearly	51.8	49.7	54.7	53.1	61.6	59.4

\# Some months missing

Mean Wind Speed – Miles Per Hour

In the United States

Dryden, Texas		Fort McIntosh, Texas		Falcón Dam, Texas	
1954	Average July 1947-1954	1954	Average Feb. 1950-1954	1954	Average July 1950-1954
4.1	4.5	2.9	3.2	3.5	4.1
5.2	5.0	3.4	3.8	3.8	5.0
5.9	5.8	4.1	4.5	4.9	5.8
6.0	6.1	4.6	4.6	6.3	6.4
6.5	6.7	3.2	4.6	6.0	7.0
7.8	7.1	4.9	5.1	6.9	7.6
5.9	5.9	3.7	4.7	6.1	7.3
5.9	5.1	5.1	4.4	6.4	6.2
4.6	4.4	3.1	3.2	4.3	4.8
4.6	4.2	2.8	2.9	3.7	3.8
4.4	4.2	2.0	2.8	3.5	4.1
4.5	3.9	2.5	2.6	4.0	3.9
5.4	5.2	3.5	3.9	5.0	5.5

DRAINAGE BASIN AND IRRIGATED AREAS

Along the Rio Grande and Tributaries – 1954

The total area within the outer rim of the Rio Grande Basin is about 335,500 square miles; however, in many places, particularly along the southwestern boundary of the basin, large areas contribute no surface runoff to the Rio Grande. Such non-contributive areas constitute about 45.7% of the total area, leaving 182,215 square miles of productive watershed. Only the productive part of the watershed is included in the list below. New and improved maps now define the outer rim of the Rio Grande basin in Mexico and its various watersheds. For use in this bulletin, such watershed areas have been recomputed, but recomputation has not yet been made of all of the areas within the outer rim of the basin in Mexico.

The irrigated areas shown below are from the most reliable sources available and are listed according to the downstream sequence of the points of diversion of their irrigation water and, consequently, they may or may not be wholly within the indicated main river or tributary reach. They are all within the Rio Grande Basin, except in the Lower Rio Grande Valley below the Rio Grande City gaging station, where water is diverted at numerous points to irrigate lands which are adjacent to but do not contribute surface runoff to the Rio Grande. All of the lands are equipped with irrigation facilities.

Irrigated areas along the Rio Grande above Elephant Butte Dam and on the Pecos River above Girvin, published in Water Bulletin No. 23 and previous bulletins are not included in the tabulation shown below. Also eliminated from this bulletin are the "Secondary" irrigated areas in Mexico. The areas shown below are the sum of the "Primary" and 50% of the "Secondary" areas. Only areas irrigated in 1954 are tabulated here.

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin Square Miles			Irrigated Areas—Acres		
	United States	Mexico	Total	United States	Mexico	Total
Above Elephant Butte Dam	25,923	0	25,923			
Elephant Butte Dam to Caballo Dam	1,295	0	1,295	0	0	0
Above Caballo Dam	27,218	0	27,218	0	0	0
Caballo Dam to El Paso Station	2,049	0	2,049	95,640	0	95,640
Above El Paso Gaging Station	29,267	0	29,267	95,640	0	95,640
El Paso Station to American Dam	4	0	4	13,994	0	13,994
Above American Dam	29,271	0	29,271	109,634	0	109,634
American Dam to Juárez Station	41	38	79	0	18,039	18,039
Above Juárez Gaging Station	29,312	38	29,350	109,634	18,039	127,673
Juárez Station to Island Station	146	455	601	33,445	0	33,445
Above Island Gaging Station	29,458	493	29,951	143,079	18,039	161,118
Island Station to County Line Station	485	174	659	0	0	0
American Dam to County Line Station - Total	672	667	1,339	33,445	18,039	51,484
Above County Line Gaging Station	29,943	667	30,610	#143,079	18,039	161,118
County Line Station to Fort Quitman Station	663	762	1,425	12,557	0	12,557
Above Fort Quitman Gaging Station	30,606	1,429	32,035	155,636	18,039	173,675
Fort Quitman Station to La Nutria	1,041	596	1,637	1,000	0	1,000
Above La Nutria Gaging Station (Inactive)	31,647	2,025	33,672	156,636	18,039	174,675
La Nutria to Upper Presidio Station	580	736	1,316	[a] 559	504	1,063
Above Upper Presidio Gaging Station	32,227	2,761	34,988	157,195	18,543	175,738
Río Conchos above Boquilla Dam	0	8,202	8,202	0	2,965	2,965
Río Conchos below Boquilla Dam	0	21,065	21,065	0	156,545	156,545
Río Conchos - Total	0	29,267	29,267	0	159,510	159,510
Upper Presidio to Lower Presidio Station - excluding Río Conchos	21	9	30	[b] 1,475	0	1,475
Upper Presidio to Lower Presidio Station - Total	21	29,276	29,297	1,475	159,510	160,985
Above Lower Presidio Gaging Station	32,248	32,037	64,285	158,670	178,053	336,723
Alamito Creek above Gaging Station	1,504	0	1,504	[c] 462	0	462
Terlingua Creek above Gaging Station	1,070	0	1,070	[d] 105	0	105
Lower Presidio to Johnson Ranch Station - excluding Alamito and Terlingua Creeks	1,439	2,417	3,856	[e] 3,045	1,483	4,528
Lower Presidio to Johnson Ranch - Total	4,013	2,417	6,430	3,612	1,483	5,095
Above Johnson Ranch Gaging Station	36,261	34,454	70,715	162,282	179,536	341,818
Johnson Ranch Station to Agua Verde Station	4,600	6,917	11,517	[f] 8,908	0	8,908
Above Agua Verde Gaging Station	40,861	41,371	82,232	171,190	179,536	350,726
Agua Verde Station to Langtry Station	1,994	569	2,563	0	0	0
Above Langtry Gaging Station	42,855	41,940	84,795	171,190	179,536	350,726
Pecos River above Girvin	29,562	0	29,562			
Pecos River, Girvin to Shumla Station	5,600	0	5,600	[g] 240	0	240
Pecos River, Shumla to Pecos River Station	131	0	131	0	0	0
Pecos River Station to Pecos at Mouth Station	15	0	15	0	0	0
Pecos River - Above Station at Mouth	35,308	0	35,308	240	0	240
Goodenough Spring above Gaging Station	1	0	1	0	0	0
Devils River above Upper Devils Station	3,903	0	3,903	0	0	0
Devils River, Upper Devils Station to Devils River Station	282	0	282	0	0	0
Devils River Station to Devils River near Mouth Station	120	0	120	0	0	0
Devils River - Above Station near Mouth	4,305	0	4,305	[h] 0	0	0
Langtry Station to Diablo Station - excluding above tributaries	221	1,793	2,014	0	0	0
Langtry Station to Diablo Station - Total	39,835	1,793	41,628	240	0	240
Above Diablo Gaging Station	82,690	43,733	126,423	171,430	179,536	350,966

See footnotes on following page.

DRAINAGE BASIN AND IRRIGATED AREAS
Along the Rio Grande and Tributaries – 1954

DESIGNATIONS OF AREAS AND GAGING STATIONS	Drainage Basin Square Miles			Irrigated Areas—Acres		
	United States	Mexico	Total	United States	Mexico	Total
Arroyo las Vacas above Gaging Station	0	358	358	0	988	988
Diablo Station to Del Rio Station - excluding Arroyo las Vacas	60	99	159	267	0	267
Diablo Station to Del Rio Station - Total	60	457	517	267	988	1,255
Above Del Rio Gaging Station	82,750	44,190	126,940	171,697	180,524	352,221
San Felipe Creek above Gaging Station	46	0	46	i 1,283	0	1,283
Pinto Creek above Gaging Station	236	0	236	j 0	0	0
Río San Diego above Gaging Station	0	848	848	0	14,248	14,248
Río San Diego - Total	0	856	856	0	15,360	15,360
Río San Rodrigo above Gaging Station	0	669	669	0	5,312	5,312
Río San Rodrigo - Total	0	958	958	0	7,042	7,042
Del Rio Station to Eagle Pass Station - excluding above tributaries	1,213	326	1,539	k 38,159	4,070	42,229
Del Rio Station to Eagle Pass Station - Total	1,495	2,140	3,635	39,442	26,472	65,914
Above Eagle Pass Gaging Station	84,245	46,330	130,575	211,139	206,996	418,135
Río Escondido above Gaging Station	0	1,279	1,279	0	10,502	10,502
Río Escondido - Total	0	1,284	1,284	0	10,502	10,502
Eagle Pass Station to San Antonio Crossing Station - excluding Río Escondido	237	251	488	450	0	450
Eagle Pass to San Antonio Crossing Station - Total	237	1,535	1,772	450	10,502	10,952
Above San Antonio Crossing Gaging Station	84,482	47,865	132,347	211,589	217,498	429,087
San Antonio Crossing to Laredo Station	1,236	2,393	3,629	5,133	8,016	13,149
Above Laredo Gaging Station	85,718	50,258	135,976	216,722	225,514	442,236
Río Salado above Venustiano Carranza Dam	0	17,296	17,296	0	58,811	58,811
Río Salado above Las Tortillas Gaging Station	0	24,870	24,870	0	105,536	105,536
Río Salado above Cd. Guerrero Gaging Station	0	25,112	25,112	0	105,536	105,536
Laredo Station to Falcón Dam - excluding Río Salado	2,042	1,352	3,394	9,985	7,490	17,475
Laredo Station to Falcón Dam - Total	2,042	26,464	28,506	9,985	113,026	123,011
Above Falcón Dam	87,760	76,722	164,482	226,707	338,540	565,247
Falcón Dam to Chapeño Gaging Station	2	54	56	195	0	195
Above Chapeño Gaging Station	87,762	76,776	164,538	226,902	338,540	565,442
Río Alamo above Gaging Station	0	1,692	1,692	0	7,660	7,660
Chapeño Station to Roma Station - excluding Río Alamo	85	149	234	2,599	3,100	5,699
Chapeño Station to Roma Station - Total	85	1,841	1,926	2,599	10,760	13,359
Above Roma Gaging Station	87,847	78,617	166,464	229,501	349,300	578,801
Río San Juan above Marte Gómez Dam	0	13,429	13,429	0	102,548	102,548
Río San Juan above Camargo Gaging Station	0	13,601	13,601	0		
Río San Juan - Total	0	13,601	13,601	0	288,408	288,408
Roma Station to Rio Grande City Station - excluding Río San Juan above Camargo	678	198	876	6,308		
Roma Station to Rio Grande City Station - excluding Total Río San Juan	678	198	876	6,308	1,900	8,208
Roma to Rio Grande City - Total	678	13,799	14,477	6,308	290,308	296,616
Above Rio Grande City Gaging Station	88,525	92,416	180,941	235,809	639,608	875,417
Rio Grande City Station to Anzaldúas Dam Site	409	788	1,197	142,304	297,663	439,967
Above Anzaldúas Dam Site	88,934	93,204	182,138	378,113	937,271	1,315,384
Anzaldúas Dam Site to Progreso Station	13	22	35	132,374	3,973	136,347
Above Progreso Gaging Station	88,947	93,226	182,173	510,487	941,244	1,451,731
Progreso Station to San Benito Station	7	7	14	200,184	6,659	206,843
Above San Benito Gaging Station	88,954	93,233	182,187	710,671	947,903	1,658,574
San Benito Station to Matamoros Station	12	12	24	147,197		
Above Matamoros Gaging Station	88,966	93,245	182,211	857,868		
Matamoros Station to Lower Brownsville Station	2	2	4	21,371		
Rio Grande City Station to Lower Brownsville Station	443	831	1,274	643,430	313,541	956,971
Above Lower Brownsville Gaging Station	88,968	93,247	182,215	879,239	953,149	1,832,388
Lower Brownsville Station to Gulf of Mexico				5,211	6,961	12,172
Above Gulf of Mexico				884,450	960,110	1,844,560

a Excludes 837 acres irrigated from wells and includes 426 acres irrigated by spreader dams. b Excludes 10 acres irrigated from wells. c Excludes 505 acres irrigated from wells and 55 acres irrigated from springs; includes 462 acres irrigated by spreader dams. d Irrigated by spreader dams. e Excludes 1,371 acres irrigated from wells and 20 acres irrigated from springs. f Excludes 35 acres irrigated from wells and 67 acres irrigated from springs; includes 8,566 acres irrigated by spreader dams. g Excludes 10,954 acres irrigated from wells and 65 acres irrigated from springs. h Excludes 969 acres irrigated from wells. i Excludes 10 acres irrigated from wells. j Excludes 480 acres irrigated from wells. k Excludes 150 acres irrigated from wells. # A substantial portion of these areas were irrigated in part or entirely from wells.

CORRECTIONS TO PREVIOUS WATER BULLETINS

DEVILS RIVER NEAR DEL RIO, TEXAS

The gage height of the September 1, 1932 flood was 36.60 feet instead of 41.0 feet, as published in Water Bulletins Numbers 5 through 23. This corrected gage height was determined by check levels run during the 1954 flood survey.

RIO GRANDE BELOW ANZALDUAS DAM SITE

In Water Bulletin Number 22, Page 42, the zero of the gage should be 82.61 above mean sea level, U.S.C. & G.S. datum, instead of 84.51 as shown.

INTERNATIONAL FALCON RESERVOIR

In Water Bulletin Number 23, Page 56, under "Water Surface Elevations and Stored Water," the Yearly Average Storage should be 328.5, instead of 32.8 as shown.

MUNICIPAL WATER USES

The Estimated signs (ᵘ) shown in the Del Rio record, on Page 68 of this bulletin, for February, April, June, and September (Period Minimum) should also be applied to the record in Water Bulletin Number 16 and succeeding bulletins.

SUSPENDED SILT IN THE RIO GRANDE AND TRIBUTARIES

In Water Bulletin Number 23, the table shown on Page 66 for the Lower Presidio Station contained several errors. The corrected table for 1953 is shown below.

Rio Grande at Lower Presidio Station — Period October 1949-1953

Month	1953							Period of Record		
	Tons		Number of Samples	Gravimetric Percentages			Acre-Feet at 1,452 Tons per Acre-Foot			
	Water	Silt		Average	Maximum Sample	Minimum Sample		Average	Maximum	Minimum
Jan.	19,436,000	1,690	12	.0087	.0131	.0052	1.2	4.2	10.3	.98
Feb.	15,349,000	1,300	10	.0085	.0125	.0062	.90	5.9	13.0	.15
Mar.	11,102,000	1,600	13	.0144	.0286	.0027	1.1	5.6	14.6	.28
Apr.	631,000	102	12	.0161	.0227	.0083	.07	1.5	2.5	.07
May	2,398,000	3,670	12	.1530	.2999	.0103	2.5	5.1	15.1	.98
June	6,174,000	* 19,600	13	* .3178	1.2024	.0085	* 13.5	* 162	510	* 7.9
July	23,864,000	163,000	11	.6810	1,8240	.0009	112	816	1,810	112
Aug.	13,874,000	88,700	13	.6390	2.6637	.0111	61.1	164	506	3.3
Sept.	32,494,000	* 73,300	13	* .2256	.3974	.0064	* 50.5	* 414	1,440	* 48.4
Oct.	8,221,000	1,480	13	.0180	.0557	.0070	1.0	123	509	1.0
Nov.	12,931,000	1,630	13	.0126	.0246	.0068	1.1	5.4	13.1	.45
Dec.	13,505,000	770	12	.0057	.0071	.0039	.53	3.0	7.6	.53
Yearly	159,979,000	*356,842	147	* .2231	2.6637	.0009	*245.50	*1,709.7	3,780.9	* 245.50

Samples and Analyses by U.S. Section, Method B. (Compare with Method A, page 69) * Corrected figures

CHEMICAL ANALYSIS OF WATER SAMPLES FROM THE RIO GRANDE AND TRIBUTARIES

Following are the correct factors for converting to parts per million, by weight, the values shown for ($HCO_3 + CO_3$) in all water bulletins:

Expressed as HCO_3, multiply by 61.0
Expressed as CO_3, multiply by 30.0

The conversion factor 30.5 shown in Water Bulletins Numbers 12 through 23 is erroneous.

DRAINAGE BASIN AND IRRIGATED AREAS

In Water Bulletin Number 23, Page 93, under "Roma to Rio Grande City - excluding Río San Juan above Camargo Station," the Irrigated Areas - Acres, Primary, In Mexico, should be zero (0), instead of 4,827 as shown.